

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM

VOLUME 4 OF 5

SPECIFICATION

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A9 DUALLING: LUNCARTY TO PASS OF BIRNAM

CONTRACT NUMBER TS/MTRIPS/WKS/2017/01

CONTRACT DOCUMENT

VOLUME 4 OF 5

SPECIFICATION

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TRANSPORT SCOTLAND

THE A9 DUALLING: LUNCARTY TO PASS OF BIRNAM

TS/MTRIPS/WKS/2017/01

CONTRACT DOCUMENT

VOLUME 4 OF 5

SPECIFICATION

DOCUMENT ISSUE RECORD

I hereby confirm that this is the current version of the Specification and supersedes all previous issues of such document by the Employer.

Signed _____
Name (Block capitals) _____
Date _____
Contractor _____

Copy of signed page shall be sent to, Transport Scotland, [REDACTED]

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A9 DUALLING: LUNCARTY TO PASS OF BIRNAM

VOLUME 4 OF 5

SPECIFICATION

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SPECIFICATION**PREAMBLE TO THE SPECIFICATION**

1. The Specification referred to in the Tender shall be the 'Specification for Highway Works', published by The Stationery Office (formerly HMSO) as Volume 1 of the Manual of Contract Documents for Highway Works, as modified and extended by the following:
 - (i) Appendix 0/1: Contract-specific Additional, Substitute and Cancelled Clauses, Tables and Figures;
 - (ii) Appendix 0/2: Contract-specific minor alterations to existing Clauses, Tables and Figures;
 - (iii) The Numbered Appendices listed in Appendix 0/3; and
 - (iv) Appendix 0/5: Special National Alterations of the Overseeing Organisation of Scotland, Wales or Northern Ireland.

Appendix 0/4 contains a list of the Drawings.

2. The relevant publication date of each page of the Specification for Highway Works is given in the Schedule of Pages and Relevant Publication Dates.
3. An Additional Clause, as indicated by a suffix 'A' in Appendix 0/5 is an alteration originating from the Overseeing Organisation of Scotland, Wales or Northern Ireland.

An Additional Clause as indicated by a suffix 'AR' in Appendix 0/1 is a Contract-specific alteration.

4. A Substitute Clause, as indicated by a suffix 'S' in Appendix 0/5 is an alteration originating from the Overseeing Organisation of Scotland, Wales or Northern Ireland.

A Substitute Clause as indicated by a suffix 'SR' in Appendix 0/1 is a Contract-specific alteration.

5. A Cancelled Clause, as indicated by a suffix 'C' in Appendix 0/5 is an alteration originating from the Overseeing Organisation of Scotland, Wales or Northern Ireland.

A Cancelled Clause indicated by a suffix 'CR' in Appendix 0/1 is a Contract-specific alteration.

6. Insofar as any of the Numbered Appendices may conflict or be inconsistent with any provision of the Specification for Highway Works the Numbered Appendices shall always prevail.

Additionally, Numbered Appendices 0/1 and 0/2 shall take precedence over Numbered Appendix 0/5.

7. Any reference in the Contract to a Clause number or Appendix shall be deemed to refer to the corresponding Substitute Clause number or Appendix listed in Appendix 0/1, 0/2 or 0/5.

8. Where a Clause is altered any original Table/Figure referred to in the Clause shall apply unless the Table/Figure is also altered.

Where a Table/Figure is altered any reference in a Clause to the original Table/Figure shall apply to the altered Table/Figure.

9. Where a Clause in the Specification relates to work goods or materials which are not required for the Works it shall be deemed not to apply.

SPECIFICATION

PREAMBLE TO THE SPECIFICATION (Continued)

10. Any Appendix referred to in the Specification which is not used shall be deemed not to apply.
11. Where a Clause in the Specification is prefixed by an # this indicates that this particular Clause has a substitute National Alteration for one or more of the Overseeing Organisations of Scotland, Wales or Northern Ireland.

Substitute or additional National Clauses shall be used within countries to which they specifically apply and they are deemed to replace corresponding Clauses in the main text of the Specification as appropriate.

The substitute National Clauses are located at the end of the relevant Series together with the additional National Clauses of the Overseeing Organisations.

12. Other than where references to the Overseeing Organisation are made in the context of the Overseeing Organisation granting statutory or type approvals, the roles and functions of the Overseeing Organisation shall be undertaken by the Engineer.

Where the Specification requires the provision of documentation to the Overseeing Organisation for statutory or type approval such documentation shall be provided to the Major Transport Infrastructure Projects (MTRIPS) group of Transport Scotland.

13. If the Specification is used in conjunction with a Contract under which the Contractor is responsible for the design of any part of the Permanent Works, the delegation of the roles and functions of the Overseeing Organisation as stated in paragraph 12 above shall be amended as follows:
 - (i) If any agreement, consent or approval required to be obtained from the Overseeing Organisation impacts on the health and safety of the general public, the environment or any property or equipment not owned or operated by the Contractor, such agreement, consent, approval shall be obtained from the Major Transport Infrastructure Projects (MTRIPS) group of Transport Scotland.
 - (ii) Where the Specification provides for the Overseeing Organisation to require a test, waive the requirement for a test or alter testing frequency, the party to whom the Overseeing Organisation's roles and functions have been ascribed by paragraph 12 above shall exercise such decisions in accordance with the requirements stated in the Contract.
14. Where a Clause or Sub-Clause in the Specification is annotated by "05/01" or similar, this indicates the relevant publication date that alteration(s) to the Clause or Sub-clause were made.

The first double digit refers to the month and the second double digit refers to the year.

SCHEDULE OF PAGES AND RELEVANT PUBLICATION DATES OF SPECIFICATION FOR HIGHWAY WORKS

Series/Appendix	Page Number	Publication Date
000	1 to 3	May 2014
000	6 to 7F	February 2016
000	4 to 5	May 2017
100	1 to 2, 4 to 9, 12 to 29F, WF1, N2 to N11F	May 2014
100	3, 10 to 11, N1	December 2014
200	1 to 3F	February 2016
300	1	May 2001
300	4	November 2002
300	2 to 3, 5 to 6F	May 2008
400	1 to 24F	May 2017
500	23 to 24, 26	November 2004
500	28F	May 2005
500	3, 22, N1F	May 2006
500	2, 5, 27	November 2006
500	6, 25	November 2007
500	1, 4, 7 to 21	November 2009
600	1 to 68, 70 to 77F, S1 to S4F, W1 to W4F, N1 to N5F	February 2016
600	69	February 2017
700	1 to 36F, N1 to N6F	February 2016
800	1 to 31F	February 2016
900	2 to 5, 9 to 22, 24 to 26, 28 to 67F	August 2008
900	1, 6 to 8, S1F	November 2008
900	23, 27	May 2009
1000	1 to 45F	February 2016

SCHEDULE OF PAGES AND RELEVANT PUBLICATION DATES OF SPECIFICATION FOR HIGHWAY WORKS (Continued)

Series/Appendix	Page Number	Publication Date
1100	N1F	November 2006
1100	3	August 2008
1100	1 to 2, 4 to 6F	February 2017
1200	5	May 2001
1200	2 to 3, W1F	August 2003
1200	1, 14 to 16F	May 2004
1200	4, 9 to 11, 13	May 2005
1200	12	November 2006
1200	6 to 7, N1 to N4F	November 2007
1200	8	May 2008
1300	N2F	November 2003
1300	3 to 4	November 2004
1300	1, 5 to 10, 12F	November 2005
1300	2, 11 and N1	May 2006
1400	2, N1F	May 2001
1400	1, 3 to 9F	May 2006
1500	1 to 31F	February 2017
1600	1, 4 to 5, 9, 15, 17 to 18, 24 to 26, 29 to 31, 35, 38, 49F	March 1998
1600	2, 6 to 8, 10 to 14, 16, 19, 27 to 28, 32 to 34, 36 to 37, 39 to 42, 44 to 48	November 2003
1600	3, 20 to 23, 43	November 2005
1700	1 to 27F	December 2014
1800	1 to 35F	August 2014
1900	1 to 35F, S1 to S2F	August 2014
2000	1, 3 to 4F	May 2001
2000	2	November 2004
2100	1 to 2F	February 2016

SCHEDULE OF PAGES AND RELEVANT PUBLICATION DATES OF SPECIFICATION FOR HIGHWAY WORKS (Continued)

Series/Appendix	Page Number	Publication Date
2300	1	March 1998
2300	2 to 3F	May 2001
2400	1, 4, 7F	May 2005
2400	2	May 2006
2400	3, 5 & 6	May 2008
2500	1	May 2001
2500	2, 8, 11F	November 2003
2500	10	November 2004
2500	6 to 7, 9	May 2005
2500	5	May 2006
2500	3 to 4	November 2006
2600	1	March 1998
2600	2 to 4	November 2003
2600	5	November 2004
2600	6	May 2005
2600	7F	November 2006
3000	4 to 7, 10, 12 to 17, 19, 22 to 27F	May 2001
3000	20	November 2004
3000	2 to 3	May 2006
3000	8 to 9, 11, 18, 21	May 2008
5000	1, 4 to 19F, S1F	May 2005
5000	2 to 3	November 2008
Appendix A	1 to 4F	May 2014
Appendix B	1 to 3F	May 2014
Appendix C	1 to 2F	May 2014
#Appendix D	1F	May 2014
Appendix D (N1)	N1F	May 2014
Appendix E	1F	May 2014
Appendix F	1 to 52F	May 2017
Appendix G	Not Used	
Appendix H	1	May 2004
Appendix H	2	November 2005
Appendix H	3	November 2006
Appendix H	4 to 9F	November 2008

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT

PART A: VOLUME 1 SPECIFICATION

LIST OF ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES

Clause No etc	Title
128AR	Training and Employment Opportunities
270 AR	Tree Felling
271 AR	Existing Vegetation to be Protected
370 AR	Rabbit, Hare Deer and Otter Fence Specifications
895 AR	Surface Modulus Measurement
952 AR	Pavement Cores
971 AR	Measurement of Texture Depth Using The TRL Mini Meter
1270 AR	Chart Node and Section Markers
1271 AR	Night Visibility
1471 AR	Special Tools
1472 AR	Fixings for Attachment to Structures
1501 SR	Introduction
1515 SR	Jointing and Termination of Fibre Optic Communications Cable
1517 SR	Earthing and Bonding
1530 SR	Cable Ducts
1531 SR	Installation of Ducts
1532 SR	Chambers for Traffic Scotland Cables
1534 SR	Closed Circuit Television
1537 SR	Data Service (SRTDb Detectors and SRTDb Equipment)
1670AR	Static Load Testing of Piles
1671AR	Pile Integrity Tests
1672AR	Drilling Fluid
1673AR	Ground Investigation
1728 AR	Construction Tolerances in Structural Concrete
1771 AR	Reinforcement Couplers
1772 AR	Concrete Repairs – General Requirements
1773 AR	Removal of Concrete in Areas to be Repaired
1774 AR	Surface Preparation
1775 AR	Concrete Repairs
1776 AR	Foamed Concrete Fill to Structures and Backfilling to Drainage Trenches
1777 AR	Installation of Resin Anchored Reinforcement
1778 AR	Early Thermal Cracking
1779 AR	Retaining Wall Concrete Finish
2171 AR	Bearing Replacement
3000 AR	Landscape Operations
3001 AR	General Conditions
3003 AR	Delivery of Plants
3004 AR	Wildlife Pond Design

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES

Clause No etc	Title and written text
128 AR	<p>Training and Employment Opportunities</p> <p>The Contractor shall adopt Training and Employment Opportunities in accordance with Appendix 0/7 of the Specification and Clause 86 of the Conditions of Contract.</p>
270 AR	<p>1 Tree Felling</p> <p>1.1 Works shall be carried out in accordance with:</p> <ul style="list-style-type: none"> a) BS 5837: 2012 - Trees in Relation to Construction. Recommendations; b) BS 3998: 2010 - Recommendations for Tree Work; and c) BS 4428: 1989 - Code of Practice for General Landscape Operations (excluding hard surfaces). <p>1.2 Marking of Trees to be Removed</p> <p>1.2.1 The Contractor shall set out the Works prior to the commencement of any tree felling operations and shall indicate with paint those trees the removal of which he considers necessary for the construction of the Permanent Works. No trees, bushes or hedges shall be felled or uprooted without approval from the Engineer. The Contractor shall submit his proposals for felling to the Engineer for approval not less than 10 working days in advance of felling works.</p> <p>1.3 Precautions</p> <p>1.3.1 Before commencing felling operations warning notices and arrangements shall be made by the Contractor to prevent public gaining access to the danger zone.</p> <p>1.3.2 When felling of mature trees takes place among trees and vegetation that shall be preserved, near property boundaries, public roads, buildings or other Structures, trees shall be carefully cut down in sections so as to avoid damage to adjacent features and vegetation. To avoid compaction of ground appropriate geotextiles shall be laid down where vehicles / plant have access to the Works Site.</p> <p>1.3.3 Where felling takes place close to side roads the Contractor shall notify the relevant roads authority and the police. The Contractor shall comply with the Code of Practice for Safety at Street and Road Works in respect of warning signs, direction notices and traffic control.</p> <p>1.3.4 The Contractor shall comply with the Special Requirements of Undertakers and other relevant companies, as provided in the Conditions of Contract.</p> <p>1.3.5 Where work is to be carried out within the vicinity of overhead telephone lines or electricity lines advice shall be sought from the relevant Undertakers.</p> <p>1.3.6 Position and depth of all pipes, cables and underground Structures shall be verified. The method of work shall take into account such items.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
270 AR (continued)	1.3.7 Voids left after the removal of stumps and roots shall be filled with suitable material and compacted in compliance with Clause 612 of the Specification.
	1.3.8 Damage to trees, tree saplings, shrubs or hedges during felling shall be made good as described in BS 3998: 2010 Tree Work, Section 8.
	1.3.9 Prior to commencement of felling and tree work operations preconstruction ecological surveys shall be undertaken to determine presence of protected species including, but not limited, to bats, red squirrels and breeding birds.
	1.3.10 Tree work shall be avoided during the bird nesting season of March to August inclusive. During the bird nesting season tree work shall be carried out only after an inspection by the Ecological Clerk of Works (ECoW) establishes that there are no nesting birds present, and only after receiving consent in writing from the Engineer.
	1.3.11 Trees shall be checked for bats and appropriate mitigation shall be provided in accordance with sub-Clause 3012.13 of the Specification. Any bat roosts identified by the Contractor shall immediately be reported to the Engineer and ECoW.
	1.3.12 No trees containing confirmed bat roosts shall be felled without the necessary licences having been obtained from SNH. Any licences required from SNH shall be arranged by the Contractor once the species of bat and population size has been confirmed by a licensed bat ecologist.
	1.3.13 The Contractor shall notify the Engineer and ECoW not less than 7 days in advance of felling any trees containing confirmed bat roosts or having the potential for bat roosting.
	1.3.14 The Contractor shall undertake a pre-felling inspection of all trees identified as containing confirmed bat roosts or having the potential for bat roosting under the supervision of a licensed bat ecologist. Each tree with bat roosts or potential for bat roosting shall be inspected by safest practicable means and searched for signs of bats, using a torch and endoscope where necessary, as directed by the licensed bat worker. Where no signs of bats and no potential access points are identified the tree may be felled subject to the approval of the licensed bat ecologist.
	1.3.15 Where felling of trees containing bat roosts is undertaken under licence and where potential access points for bats are identified, the trees shall be section felled with the feature of interest lowered gently to the ground on a rope in the presence of the licensed bat ecologist, searched and left on the ground for a period of 24 to 48 hours with the access point exposed to allow any roosting bats to disperse.
	1.3.16 Should any bats be found to be present in trees during felling the Contractor shall cease felling works in the area and immediately contact SNH, the licensed bat ecologist and the Engineer and seek their instructions. No further works shall be undertaken on trees containing roosting bats without permission from SNH.
	1.4 Weather Conditions for Tree Work

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
270 AR (continued)	1.4.1 Work shall cease when trees are very wet, covered in ice or snow, or during storms or high winds except in emergencies, where any work shall be the minimum to make the situation safe.
	1.5 Grubbing up Stumps and Filling Voids
	1.5.1 All stumps and tree roots shall be grubbed up, except stumps in woodland within areas of existing vegetation to be retained, provided this does not damage trees which are being retained. If a stump cannot be removed it shall be cut at least 300 millimetres below ground level, the hole shall be filled with soil, compacted, levelled and seeded.
	1.6 Chipping of Wood and Bark
	1.6.1 Small timber, twigs, bark and roots not infected by honey fungus may be chipped and left on the Site to compost at locations to be agreed with the Engineer and shall be turned over at specified intervals.
	1.7 Preliminary Tree Work - BS 3998: 2010
	1.7.1 The Contractor shall give notice of proposed tree work in conservation areas, and shall seek permission from the relevant authority where trees are protected by a Tree Preservation Order.
	1.7.2 Pruning works include the removal of dead, diseased or damaged branches, removal of heavy branches, crown lifting, crown thinning, pruning damaged tree saplings, bushes and roots and pruning and shaping of overgrown / neglected hedges.
	1.7.3 When a branch is to be removed the cut surface should be made at a fork or at the main stem and the final cut should be just outside the branch bark collar, where present. When there is not a collar the angle of the cut shall be the mirror image of the branch bark ridge (BS 3998: 2010: Page 13; 22; 23; Figure 1 and Figure 2). The outline of pruned trees shall be fair and symmetrical.
	1.7.4 Sealing of the cut surface with an approved wound protectant shall be carried out when there is a high risk of fungal or bacterial infection (BS 3998: 2010: Pages 34 and 35). Otherwise heartwood exposed by pruning shall be left untreated so that the surface dries out. A bitumastic or latex based paint shall be applied to the outer edge of the cut to prevent drying and dieback of the cambium. Treatment of the whole wound is for cosmetic reasons only; a thin layer of bitumastic or latex based paint or household emulsion can be applied.
	1.7.5 Heavy limbs shall be taken down in sections and shall be lowered with ropes to avoid damage to the tree and its surroundings. The method of pruning and sealing of cut surfaces shall be as prescribed.
	1.7.6 In crown lifting lower branches shall be removed to a given height above ground level in a manner described.
	1.7.7 Crown thinning involves the removal of a proportion of secondary branch growth throughout the crown to produce an open crown. Thinning shall not be too severe as it may induce fresh growth of epicormic shoots.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
270 AR (continued)	<p>1.7.8 Damaged tree saplings shall be cut back to sound wood just above a bud. Damaged bushes shall be cut to sound wood or the whole plant shall be cut to base to allow fresh growth to take over.</p> <p>1.8 Timber - Stacking</p> <p>1.8.1 Timber shall not be stacked against existing trees and shrubs to be retained. Timber stacks shall not exceed one metre high under any circumstances. Timber stacks shall be constructed in such a way as to prevent the movement or slippage of timber.</p> <p>1.9 Existing Woodland</p> <p>1.9.1 The timber from native species to be felled within or adjacent to, existing woodland shall be left within the woodland for habitat enhancement. Stumps within woodland are not to be ground down or removed.</p>
271 AR	<p>1. Existing Vegetation to be Protected</p> <p>1.1 Protection of existing vegetation which is to be retained shall be in accordance with BS 5837: 2012 and as follows:</p> <p>a) The Contractor shall ensure that all work is safeguarded against damage due to the carrying out of other Site operations. Should any damage or loss be caused to any existing or completed works then the Contractor shall reinstate and make good such damage or loss all with the acknowledgement in writing of the Engineer.</p> <p>b) No existing mature trees, protected or designated landscape areas or other artefact shall be removed or cleaned without the prior written agreement of the Engineer. The proposed extent of Site clearance works shall be submitted to the Engineer prior to the Works starting on the Works Site.</p> <p>c) Trees, bushes, undergrowth and other vegetation to be preserved shall be fenced off with protective barrier fencing as detailed in BS 5837: 2012 (Figures 2 and 3) or type CW 120 cleft chestnut pale fencing complying with BS 1722, Part 4 1986, placed in accordance with BS 5837: 2012, and shall be maintained in effective condition until the Works have been fully completed. Fences shall be erected before the Works commence. No existing trees, shrubs, or other plants shall be removed or cut without specific written instructions from the Designer. Protective fencing in accordance with BS 5837: 2012 shall be erected prior to commencement of the Works to protect the areas shown in drawings. No soil, spoil, fuel oil, chemicals, construction materials or rubbish shall be stored or tipped within the spread of existing trees, shrubs or hedges.</p> <p>d) Should any tree or shrub be mistakenly uprooted, destroyed, or in the opinion of the Engineer, be damaged beyond reasonable chance of survival in its original shape due to the Contractor's negligence, then the Contractor shall provide and plant suitable replacement trees or shrubs of a similar type and age. If such replacement trees or shrubs are not obtainable, alternative trees or</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
271 AR (continued)	<p>shrubs, acknowledged in writing by the Engineer, shall be provided and planted. The Contractor's liability shall continue until the replacement trees and shrubs have survived the winter following the planting and have completed satisfactorily the following summer's growth.</p> <p>2. Management of Existing Vegetation to be Retained</p> <p>2.1 The Contractor shall manage existing vegetation to be retained in accordance with paragraphs 4.4.9.14 to 4.4.9.18 of Part 1.</p>
370 AR	<p>1. Rabbit, Hare, Deer and Otter Fence Specifications</p> <p>1.1 Rabbits and Hares</p> <p>1.1.1 Fences to protect planting areas from rabbits and hares shall be in accordance with the following specification:</p> <p>(a) Post and mesh fence with a galvanised hexagonal wire mesh 1200 millimetres wide having maximum openings of 31 millimetres and 1.25 millimetres (18 gauge) wire. Mesh to be affixed to two galvanised line wires of minimum 4 millimetres in diameter at 900 millimetres and 150 millimetres above ground level using galvanised fixing rings every 600 millimetres on top wire and 1200 millimetres on bottom wire. Mesh to be buried to 150 millimetres depth and returned outwards from protected area. End and change of direction posts to be 125 millimetres diameter round section, 1.87 metres long and driven 770 millimetres into the ground. Strut to be 65 millimetres round section located in notch on main post and held in the ground by 0.6 metre split rail. Line posts to be 1.6 metres long and 65 millimetres square section driven 500 millimetres into the ground at 4 metre centres. Mesh also to be fixed to line posts by 6 number staples per post.</p> <p>1.2 Deer Fencing</p> <p>1.2.1 Fences to protect planting areas from deer shall be in accordance with the following specification:</p> <p>a) 1.80 metres high timber post and 4 wire deer fence with rectangular wire mesh.</p> <p>b) Fence shall be constructed to the details on HCD Drawing H12 and BS1722 Parts 2 & 3 with the following additions and amendments:-</p> <p>(i) Top rectangular wire mesh to be type C/6/90/30.</p> <p>(ii) Bottom rectangular wire mesh to be type C/8/80/15.</p> <p>(iii) Timber posts and struts are to be for a 1.8 metres high fence selected from either Table 4 or 5 from BS1722 Part 3. Timber straining posts are to be 2.90 metres length, 178 millimetres minimum diameter.</p> <p>(iv) Intermediate posts are to be set or driven into the ground to a depth of 0.6 metres. Straining posts shall be set into the ground to a depth of 1.0 metre.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
370 AR (continued)	<p>(v) Struts are to be anchored in the ground in rammed backfill with a 450 x 102 x 51 millimetres timber thrust plate attached to the end of the strut.</p> <p>(vi) 4 line wires complying with the requirements of Clause 2.1 BS1722-4 Part 4, shall be provided set 50, 850, 1750, 1800 millimetres above ground level. The wire mesh shall be attached to the line wires to the details of Clause 3.3.2.4 BS1722-4 Part 4.</p> <p>(vii) Intermediate posts are to be provided at intervals not exceeding 2.75 metres.</p> <p>(viii) Existing ground must be trimmed to maintain the 50 millimetres distance between the ground and the bottom of the fence.</p> <p>1.3 Combined Otter and Badger Fencing</p> <p>1.3.1 Combined Otter and Badger fences shall be in accordance with Specification Appendix 30/12.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
895 AR	<p>Surface Modulus Measurement</p> <ol style="list-style-type: none"> 1. Surface Modulus testing must be carried out using Dynamic Plate Test Device, which has been calibrated to the manufacture's specification. Regular checking and calibration of the load cell and deflection sensors must be carried out as recommended by the manufacturer. The equipment must be capable of producing a peak stress of 100kPa with a pulse rise time of between 8 to 12 milliseconds, applied to a rigid circular plate of 300mm diameter. Both the applied load and the transient deflection, measured directly on the tested surface, must be recorded. The deflection measurement transducer must be capable of measuring deflections in the range 40-1500 microns. The accuracy of the readings should be ± 0.1 kN for the load and ± 2 microns for deflection. 2. The peak stress applied during each test shall be selected to produce as high a deflection as possible within the measurement range of the deflection sensor. 3. The following procedure is to be adopted for dynamic plate testing. Each test site should be stable and flat and free from water, ice and snow. The temperature down to 100mm below the surface should be at least 4°C. For a lightweight test device, at least 10 drops are necessary at the beginning of each test session to warm up the rubber buffers. At each test point, 3 initial 'seating' drops shall be carried out to bed the plate into the surface. Three further drops shall then be carried out. The results from the last set of three drops shall be averaged to given the Surface Modulus applicable to that test point. 4. The stiffness modulus shall be computed at each point tested, using the following formula: $E = \frac{2(1 - \nu^2) \times R \times P}{D}$ <p>where:</p> <ul style="list-style-type: none"> E = Foundation Surface Modulus (in MN/m² or MPa) ν = Poisson's Ratio (ν, by default, = 0.35) R = Load Plate Radius (R, by default, = 150mm) P = Contact Pressure (in kPa) D = Deflection under the centre of the plate (in microns) 5. If a lightweight test device is used, it must be correlated to an FWD which will remain the reference test method. The following procedure must to be used to correlate a lightweight device: The FWD and the lightweight devices are to both to be used on the same material and at adjacent test positions in the Demonstration Area for the 25 measurement points. The Surface Modulus values obtained from the two devices are to be compared and the square of the correlation coefficient (r^2) is to be calculated, if this value is more than 0.45 then there is considered to be sufficient correlation between the two devices.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
895 AR (continued)	An adjustment factor should then be calculated as the mean of the ratios of each FWD value to lightweight value. The lightweight device readings are to be adjusted by this factor for all further readings on that material for that scheme.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
952 AR	<p>Pavement Cores</p> <ol style="list-style-type: none"> 1. Nominal 150mm diameter cores, required for sampling and testing at the frequencies stated in Appendix 1/5, shall be taken using a suitable coring machine in accordance with BS 598:Part100 2. For each core extracted a Roadside Record Sheet (RRS1) shall be completed in order to record the site location, coring conditions and condition of the core. 3. All cores shall be labelled, protected, transported and stored according to the Testing Organisation's quality procedures. 4. In the laboratory each core, prior to any testing, shall be examined, photographed and the information recorded on a Core Record Sheet (CRS1). The cores shall be photographed on a white background with the project, location and core number clearly shown together with the units of measurement that will be easily identifiable on the size of photograph produced. 5. The records are to be stored within the Contractors Quality Records and made available to the Overseeing Organisation when required.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

ROADSIDE RECORD SHEET (RRS1)**a) General**

Project Name	
Coring Date	
Core Number	
Chainage	
Road Name	
Road Type (See Note 1)	
Lane Direction (See Note 2)	
Lane Number (See Note 3)	
Weather Conditions	

b) Pavement Coring Description

Did the core barrel lock/jam whilst cutting pavement?	Yes	No	If Yes, at what depth? Depth (mm):	
Were there difficulties in extracting the core from the barrel?	Yes		No	
Condition of core (Tick as appropriate)	Good	De-bonded	Shattered	Partial recovery
Depth of coring				
Core length				
Any additional information on the core not included above				

Notes:

1. Insert as appropriate i.e. D2AP, S2 etc.
2. Insert eastbound, westbound, northbound, and southbound as appropriate.
3. Insert appropriate descriptor e.g. lane 1 (nearside), lane 2 (offside), hard shoulder.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Core Record Sheet (CRS1)

Project Name					Road type (See Note 1)		
Road Name					Lane Direction (See Note 2)		
Coring Date					Lane Number (See Note 3)		
Core Number					Chainage		
Layer	Layers				Aggregate		Comments
Number	Top (mm)	Bottom (mm)	Thickness (mm)	Material	Maximum size (mm)	Type	
<p>Insert picture of core HERE</p> <p><i>(The units of measurement should be clearly seen on the photograph)</i></p>							

Notes:

- 1) Insert as appropriate i.e. D2AP, S2 etc.
- 2) Insert eastbound, westbound, northbound, and southbound as appropriate.
- 3) Insert appropriate descriptor e.g. lane 1 (nearside), lane 2 (offside), hard shoulder.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
971 AR	<p>Measurement of Texture Depth Using The TRL Mini Meter</p> <ol style="list-style-type: none"> 1. Texture depth may be measured by TRL Mini Meter (TMM) manufactured or modified to and calibrated to the 1985 TRL specification by a licensed manufacturer. 2. The TMM will be operated and maintained in accordance with the manufacturer's instructions and recommendations as contained in their operating maintenance manual (1986). A Certificate showing the Calibration Factor certified by the manufacturer and dated less than 12 months prior to use will be kept available for reference. This calibration factor must agree with that shown on the recording tape output by the TMM. 3. Texture depth will be measured as soon as possible after surfacing has been laid and before the surfacing has been open to traffic. The road shall be clean, free from loose material and dry or barely damp. 4. The TMM will be operated at a speed between 3 and 6 kph on the "Texture HRA" program. 5. The sensitivity of the TMM will be checked daily on the check provided. The drop out percentage (DO%) of five consecutive tests averaged to the nearest whole number shall be 40 +/-3%. 6. Surface texture will be measured over one or more sections of carriageway lane 1000m in length or the complete carriageway lane if less than 1000m. Measurements will be made on successive 50m lane lengths along the whole of the section tested, on a diagonal line across the carriageway lane width from left to right in the direction of traffic flow. No measurements will be taken closer than 300mm to the edge of the carriageway. 7. The report will be made in accordance with this clause and include the following: <ol style="list-style-type: none"> (a) The serial number and calibration factor of the meter used. (b) The location of each lane tested. (c) The individual Sensor Measured Texture Depth (SMTD) for each 50m lane length comprising each section together with their average value. (d) Affirmation that the surface course was dry, clean and untrafficked. Any departure from this must be reported. (e) A copy of the printed output for any 50m lane length where the message "DO% HIGH" or "DO% LOW" has been printed in place of the 10m results, together with clear identification of location.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
971 AR (continued)	<p>8. The TRL Mini Meter may be used on all surfacing contracts where texture depth is a requirement. However for comparative purposes the sand patch test, in accordance with BSI BS EN 13036-1, is to be used in addition to the Mini Meter. One set of tests will be required for each 10,000m² of surfacing or part thereof laid under any contract. The Sand Patch Tests shall be carried out in a linear manner along the same track as the Mini Meter. This supersedes the particular requirement of BS 598: Part 5 concerning the alignment of the sand patch test locations. The Contractor shall record the location of the Sand Patch Tests and submit details to the Engineer in order that a direct comparison can be made between results.</p>
1270 AR	<p>Chart Node and Section Markers</p> <p>1. Cored thermoplastic road markers shall be installed as chart nodes using the following method:</p> <ul style="list-style-type: none"> (a) A 100 millimetres diameter x 20 millimetres deep socket shall be formed using a central pilot bit surrounded by an annular bit. The pilot bit permits drilling of an annulus by the annular bit in a precise location by guiding the annular bit. (b) The base of the pocket after breaking out the surface material shall be left jagged. This jagged base assists in the retention of the stud in the pocket. (c) The pocket shall be filled with hot fluid thermoplastic material to the uppermost edge of the pocket projecting slightly above the road surface. This projection depends on the surface tension of the material. The material is then allowed to cool and set to form a stud. (d) The material shall consist of a plastic resin with the white filler and reflective glass particles to BS 3262. This is the same material as is used for white lining purposes. <p>2. Notwithstanding any other requirements of the Contract, record drawings of the chart node locations shall be provided in accordance with Section 7 of Part 1 of the Employers Requirements.</p>
1271 AR	<p>Night Visibility</p> <p>Immediately after application and throughout the period of 60 months thereafter, the retro-reflectivity of the road marking line shall be not less than 150 mcd/lux/m² when measured in accordance with the method below:</p> <p>1. Apparatus</p> <p>The apparatus for measuring the retroreflectivity (SL value) of material shall consist essentially of a light source and a photodetector with a geometry for observation and illumination of 1.37 degrees and 0.74 degrees respectively.</p> <p>2. Procedure</p> <p>Calibrate the instrument in accordance with the manufacturer's instructions.</p>
Clause No etc	Title and written text

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1271 AR (continued)	<p>Air temperature shall not be below 10 degrees nor exceed 30 degrees centigrade.</p> <p>The area to be measured shall be 200 millimetres x 100 millimetres. Measurements shall be made at five positions at approximately 200 millimetre intervals along the marking. This procedure shall be repeated at two further locations along the line and within 50 metres of the first set of measurements. The overall average of the fifteen readings shall be reported as the retro-reflectivity value. The road marking will be tested in a dry condition after removal of any loose dirt or foreign particles. If the retroreflectivity value measured is less than the specified value the line shall be thoroughly wetted and cleaned following BS 3262: Part 2 Clause D2 procedure, then dried and re-measured.</p>
1471 AR	<p>Special Tools</p> <p>1. Duplicate sets of special tools, keys and handling devices essential for the correct running operation and maintenance of any equipment shall be made available to the Overseeing Organisation and provided to the Overseeing Organisation on Completion of the Works.</p>
1472 AR	<p>Fixings for Attachment to Structures</p> <p>1. Fixings for attachment to Structures shall use a resin fixed replaceable bolt system.</p>
1501 SR	<p>Introduction</p> <p>1. Motorway and Trunk Road Communications for the Scottish Trunk Road Network shall be referred to as Traffic Scotland Equipment. The Traffic Scotland Equipment is provided to support the provision of Traffic Scotland service and forms part of the Scottish Minister's Intelligent Transport System. All work relating to the design provision, uplifting, diversion, relocation, construction, installation, connection, testing, commissioning, integration, documentation and handover of Traffic Scotland Equipment shall comply with this Series. This Series supersedes all previously published versions of this Specification Series. For the purposes of this Series unless otherwise described in the Employer's Requirements the word "provide" or "provision" means design, uplift, divert, relocate, construct, install, connect, test, commission, integrate, document and handover to maintenance and operations.</p> <p>2. This document serves as the outline specification for the provision of Traffic Scotland Equipment which shall typically consist inter alia of the following elements:</p> <ul style="list-style-type: none"> (a) Ducting and chambers and cable management systems (b) Cables and all cable fittings (c) Cabinets and all ancillary items (d) Closed Circuit Television Cameras (CCTV cameras) (e) Not used

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1501 SR (continued)	<p>(f) Data Service (previously Scottish Roads Traffic Database SRTDb) vehicle detection) – EuroVI classification levels</p> <p>(g) Not used</p> <p>(h) Not used</p> <p>(i) Not used</p> <p>(j) Not used</p> <p>(k) Not used</p> <p>(l) Not used</p> <p>(m) Not used</p> <p>(n) Not used</p> <p>(o) Data Service (previously Weigh In Motion (WIM) systems) – where required as part of (f) above</p> <p>(p) Communications infrastructure</p> <p>(q) Mains power supply and distribution infrastructure</p> <p>(r) Not used</p> <p>(s) Hard landscaping</p> <p>(t) Not used</p> <p>(u) Structural infrastructure on which Traffic Scotland equipment is mounted.</p> <p>(v) Distributed Acoustic Sensing System</p> <p>3. The Overseeing Organisation is Transport Scotland, an agency of the Scottish Government. The representative of the Overseeing Organisation is the Traffic Scotland Manager who is responsible for all aspects of the Traffic Scotland Equipment. Contact details for the Traffic Scotland Manager are provided in the Employer’s Requirements.</p> <p>4. The Traffic Scotland Equipment and system are unique and differ in many respects from other driver information and control systems operating within the UK such as those operated by the Highways England. The Contractor shall ensure that all parties working on any Traffic Scotland element of the Contract take cognisance of the differences as expressed in this Series 1500 and other relevant documents.</p> <p>5. This Series 1500 is applicable to all work undertaken under any Contract that includes Traffic Scotland Equipment and structural infrastructure on which Traffic Scotland Equipment is mounted.</p> <p>6. Roadside verges on or into which Traffic Scotland infrastructure or equipment is to be provided shall be of an adequate width and topology acceptable to Traffic Scotland. The Traffic Scotland roadside sites shall be suitable for future maintenance activities and shall either be finished horizontal or be of an appropriate minor single gradient.</p> <p>7. The design and construction of any works adjacent to a Traffic Scotland Equipment location shall be such as to adequately route surface water away from the Traffic Scotland Equipment.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1501 SR (continued)	<p>8. The design of safety fences, barriers and works directly adjacent to Traffic Scotland Equipment shall ensure that such works are achievable and are undertaken without the adjacent Traffic Scotland Equipment being damaged or the service provided by that Traffic Scotland Equipment being adversely affected.</p> <p>9. There are requirements for all Traffic Scotland Equipment to be protected from collision by:</p> <ul style="list-style-type: none"> (a) a suitable vehicle restraint system provided in accordance with all relevant requirements and specifications relating to vehicle restraint systems; (b) be of passively safe construction; or (c) located on the verge, conventionally by distance from the kerb-line, in such a way to provide protection in accordance with all relevant requirements and specifications.
1515 SR	<p>Jointing and Termination of Fibre Optic Communications Cable</p> <p>1. Where fibre Optic Communication cables are to be jointed and terminated in Common Equipment Cabinets (CEC) or within Transmission Stations this shall be carried out using standard 1U 19" termination units and associated break out boxes. In circumstances where the Contractor requires to temporarily divert fibre optic cables terminations can be carried out in 609 cabinets.</p> <p>2. Within existing Transmission Stations, the Contractor shall use the existing fibre optic cable jointing and termination facilities or provide the same as existing fibre optic cable jointing and termination facilities if the existing facilities do not have the capacity to accommodate the fibre optic cable being provided in compliance with the Employer's Requirements.</p> <p>3. Where fibre optic cables are required to terminate within a 609 cabinet or a non - environmental enclosure then the cables shall be terminated in an approved hermetically sealed box containing silica gel to prevent damage due to the occurrence of moisture. The fibres shall be fusion spliced and protected from mechanical strain. The fusion splicing shall not cause losses greater than that detailed in MCG 1055.</p> <p>4. Where the Contractor requires to terminate fibre optic communication cables in existing fibre optic communication termination cabinets or cabinets which contain operational Traffic Scotland Equipment the Contractor shall comply with Clause 1522.</p> <p>5. Unless required for equipment connection, all joints shall be permanent fusion-spliced type.</p>
1517 SR	<p>Earthing and Bonding</p> <p>1. The earthing and bonding of the Traffic Scotland installations shall comply with the requirements contained in BS7671 and BS7430. Where required, further details of the earthing and bonding requirements may also be given in the Employer's Requirements.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1517 SR (continued)	<ol style="list-style-type: none"> <li>2. The area of gland plates or boxes, which will come into contact with a cable gland shall be cleaned prior to fitting of all paint and, in existing equipment any corrosion, before a cable gland is fitted. Once the gland is fitted, exposed metalwork of gland plates or enclosures where required, shall be suitably treated to protect against corrosion. Furthermore, an appropriate earth tag forming part of the gland kit, and retained by the gland fixing nut, shall also be installed and connected to the main earth bonding point within the cabinet using correctly sized cable and crimps as required by the Electricity Safety, Quality and Continuity Regulations. This bonding cable shall be copper and have insulation coloured green/yellow – also see Clause 1517.5 below. <li>3. All connections to bolted fixtures shall be made through crimped type lugs and using correctly sized bolts with appropriate washers and lock nut all as NDX1002-01 <li>4. All Traffic Scotland Equipment cabinets grouped in close proximity shall be correctly earth bonded relative to each other in accordance with the requirements of BS7671 Regulations. The Contractor shall introduce such correct and adequate earth bonding arrangements particularly when the cabinet group includes cabinets energised from different DNO supplies. It is the designer's responsibility to design the installation to ensure fault currents from earth faults on other systems do not enter the Traffic Scotland cable infrastructure. Additionally, hazards that may arise from 'simultaneous touch' issues must be fully addressed in the design and installation. <li>5. In all Traffic Scotland Equipment cabinets all SWA gland earth tags shall be installed within the cabinet and bonded together and to the cabinet earth stud using green/yellow insulated bonding wire unless otherwise required by applicable Regulations. This requirement applies to all SWA Communications and Power Supply cables. <li>6. At all equipment sites where a power supply is installed it is a requirement that an earth electrode be installed as follows: <ol style="list-style-type: none"> <li>(a) If the Termination Pillar contains the DNO's cut out, then an earth electrode will be installed adjacent to the Termination Pillar in accordance with the requirements of BS7671 and BS7430. <li>(b) Where Traffic Scotland equipment includes a mast or support introducing an increased risk of damage by lightning then an earth electrode shall be installed adjacent to the cabinet as a local earth with resistance no greater than 10 ohms. <li>7. All pillar, cabinet and Signal pole doors shall be earth bonded to the main structure chassis using a flexible 6 mm sq. green/yellow insulated conductor cable reference. The bonding conductor shall be sufficiently long as not to be strained when the doors are fully extended. Where crimp terminals are used these shall be sound in assembly and protected from strain typically using an insulated clip or similar retaining arrangement. <li>8. Preference shall be given to the use of earth mat electrodes in place of earth rods particularly where there is a risk of accidental penetration of an existing cable during installation, or difficulties arise achieving a low earth

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1517 SR (continued)	electrode resistance. The relevant Health and Safety Executive guidance document is "Avoiding Danger from Underground Services" HSG47.
1530 SR	<p>Cable Ducts</p> <ol style="list-style-type: none"> 1. The term cable duct used in this Series describes the ducts used for Traffic Scotland communication and power cables. 2. Longitudinal ducts are those ducts forming the longitudinal route of ducts installed generally parallel to the carriageway. Transverse ducts are those ducts linking the longitudinal ducts and installed underneath and at right angles to the carriageway. Local ducts are those ducts installed from chambers forming part of the longitudinal duct network to the cabinets and Traffic Scotland equipment. 3. The ducts installed to this specification are used for all types of Traffic Scotland cables. 4. The ducts shall comply with this Series and the Employer's Requirements. The Contractor shall be responsible for ensuring that all components used within the ducts are compatible with each other, with the cable and with existing ducts to which they may be connected. 5. The ducts shall comply with the general requirements of BS EN 61386-1 and in particular requirements of BS EN 61386-24. The ducts shall have a current British Board of Agreement Roads and Bridges Certificate or equivalent in accordance with Clause 104. 6. The ducts shall be manufactured from thermoplastic material. The bore shall be smooth and even. The external surface shall be even or corrugated in the longitudinal section. The ducts shall be twin walled. Non homogeneous ducts with honeycomb or foam filled construction between the inner and outer surfaces shall not be permitted. 7. The longitudinal, transverse and local ducts shall meet BS EN 61386-24 and be classified as "Normal duty" and rigid. These ducts will be supplied and laid in lengths no greater than 6 metres and be jointed using compatible couplers, sealing rings and lubricant. Rigid smooth walled pre-formed bends and junctions shall be used. Pliable or flexible ducting shall not be used to provide a continuous route. 8. The nominal sizes of the ducts shall be as described in the Employer's Requirements. The minimum internal diameters shall be 150 mm, 100 mm and 50 mm. 9. The external wall of the ducts shall be coloured black for all Traffic Scotland installations regardless of whether they contain power or communications cable. 10. The materials from which the duct and fittings are made shall be treated so that they are protected from the deleterious effects of short term exposure to ultra violet light and shall be resistant to degradation by acids, alkalis, common chemicals, bacteria, fungi, and moulds occurring in soils. The Contractor shall protect the duct and fittings on site in accordance with the supplier's recommendations.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
<p>1530 SR (continued)</p>	<p>11. Each duct shall be fitted with a pigmented, stranded polypropylene or equivalent rot-proof material draw cord of 5kN breaking load and having a design life of not less than 20 years, the ends of which shall be secured within the chamber or enclosure to which the duct is terminated. Draw cords shall be secured to the duct plugs where fitted. Draw cords shall not be knotted within ducts; where a joint is required it shall be a spliced joint.</p> <p>12. The duct network shall be sealed in compliance with Clause 1533.</p> <p>13. Ducts containing Traffic Scotland cables or power cables for motorway communications systems installed on motorways shall be clearly and permanently marked with the legend "MOTORWAY COMMUNICATIONS /POWER" in two, diametrically opposite, planes. The ducts shall be installed such that the legend is uppermost. The method of marking shall not affect the integrity of the duct. This marking is in addition of the markings required in the BS EN 61386 series. The method marking and the durability test shall comply with the BS EN 61386 series.</p> <p>14. Each duct shall be fitted with a proprietary branded duct insert as shown in NDX1063-00.</p> <p>15. Two, four and six way ducts shall be supplied with purpose made spacers and strapping as indicated on drawing NDX1063-00. The strapping shall bind the ducts tightly in the specified formation during installation, back-filling and for the whole life of the duct. The spacing of the strapping shall be such that the ducts shall not separate by more than 50 mm; this spacing would typically be 1m. The contact area between spacer and duct shall be large enough to ensure that the spacer cannot penetrate or distort the walls of the duct.</p>
<p>1531 SR</p>	<p>Installation of Ducts</p> <p>1. ITS Ducts shall be laid at the level as shown in NDX1063-00 and at an offset typically no greater than 2 metres from the white-line marking the edge of the carriageway. Longitudinal ducts shall generally be run parallel to the edge of the hard-shoulder. Transverse ducts shall run at right angles to the carriageway. The exact location of the ducts shall be in accordance with the drawings or where applicable the Contractor's Design. All ducts shall terminate in an access chamber. Excavations shall comply with Clauses 502 and 602. Immediately following the excavation of the trench, the ducts shall be jointed and laid on the bedding material. Newly laid ducts shall not deviate unnecessarily from straight such as to cause undue loading on the cables during installation. The deviation in level from that specified at any point shall not exceed 50mm.</p> <p>2. Ducts and fittings shall be examined for damage and the joint surfaces and components shall be cleaned immediately before laying. Measures shall be taken to prevent soil or other material from entering ducts, and to anchor each duct to prevent movement before the work is complete.</p> <p>3. Cable ducts shall comply with the appropriate British Standard and shall be tested in accordance with Clause 1533. Ducts with push-fit joints shall have a register and clear markings to ensure that the duct joint is fully engaged.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1531 SR (continued)	<ol style="list-style-type: none"> 4. Cable duct configurations, bedding, haunching and surround shall be as shown on drawing NDX1063-00. 5. Backfilling shall be undertaken immediately after the required operations preceding it have been completed. 6. Trenches for the cable ducts shown on drawing NDX1063-00 shall be backfilled with Class 8 lower trench fill material, as described in Table 6/1 and in compliance with the 600 Series, which shall be placed above the surround material. The Class 8 material shall extend to within 150 mm of ground level. The material shall be spread and compacted evenly without dislodging, disturbing or damaging the ducts. Power hammers shall not be used within 300 mm of the ducts. 7. For ducts shown on drawing NDX1063-00, top soiling, grass seeding and/or turfing as described in Clause 618 and 3005 shall be placed in the top 150 mm of the cable duct trench unless otherwise specified in the Employer's Requirements. 8. For ducts shown on drawing NDX1063-00 marker tape shall be laid within the trench excavation at a depth of 150 mm or at the class A/topsoil interface whichever is the greater. The marker tape shall comply with Clause 1511. 9. Prior to mandreling, the Contractor shall swab through each duct to clear all debris. 10. Ducts that are laid across or within the filter drains (French drains) shall be surrounded with 150 mm of mix ST2 concrete in compliance with Clause 2602. In the event that the route of a duct comes within 500mm of the line of a filter drain then either an alternative line shall be determined or precautions taken to ensure that the granular infill used to surround the ducting cannot, over time, compromise the integrity of the filter drain by migration of the infill material into the drain. Any damage caused by the Contractor to any drain shall be repaired to the satisfaction of the Overseeing Organisation and at no cost to the Employer. 11. Unless otherwise described in the Employer's Requirements the Traffic Scotland equipment duct network comprises of: <ol style="list-style-type: none"> (a) Twin 100mm inside diameter and, where required, a single 150mm inside diameter, sealed longitudinal communication ducts installed along both verges terminating at each roadside longitudinal Type A chamber constructed at each equipment site and at transverse duct locations and additional locations such that no duct run is greater than 500m. A nominal spacing of Type A chambers shall be 500m centres. Where installed the 150mm inside diameter longitudinal duct shall run no closer than 500mm from either of the 100mm inside diameter ducts. The duct network and chamber spacing shall be designed with full allowance for manufactured cable lengths available, cable runs to cabinets and the required spare cable allowance. Additional Type A chambers shall be provided where changes of level or direction occur. (b) Twin 100mm inside diameter sealed communication ducts and, where required, a single 150mm inside diameter sealed transverse

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1531 SR (continued)	<p>communication duct to be installed at carriageway cross connection points terminating at each roadside longitudinal Type A chamber. The 150mm inside diameter longitudinal duct shall run no closer than 500mm from either of the 100mm inside diameter ducts.</p> <p>(c) Other additional single 100mm inside diameter local ducts as typically shown in NDX1063-00, as required;</p> <p>(d) Additional single 150 mm inside diameter local power ducts for power cable connection typically from Termination Pillar to Traffic Equipment Distribution Pillars as required. 150mm inside diameter longitudinal ducts shall run no closer than 500mm to any adjacent 100mm inside diameter ducts.</p> <p>12. Duct infrastructure requirements for future use by third party providers of broadband services shall be as per the requirements of the Traffic Scotland Equipment duct network, with the exception of the typical offset requirement of 2 metres.</p>
1532 SR	<p>Installation of Chambers</p> <p>1. Chambers shall be either a Type A, B, C or Loop chamber (Type D). Chambers Type A, B and C are rectangular in plan with a standard plan size and are constructed so that their covers are raised 50mm above the level of the adjacent ground. Type A and B are shown in the drawings NDX1063-01 and NDX1063-02. Type C is shown on NDX1063-03. The construction of the Detector Loop roadside chamber is shown in NDX1063-04.</p> <p>2. Chambers shall be used solely for Traffic Scotland Equipment.</p> <p>3. Unless otherwise described in the Employer's Requirements, the following chamber types shall be installed at the locations as follows:</p> <p>(a) Type A chambers shall be placed at a maximum 500m intervals along the length of the longitudinal ducts in both verges. The chambers shall be installed at the same chainage in both verges.</p> <p>(b) A cable stowage Type C chamber shall be constructed adjacent to all individual or group of communications cable termination cabinets and at other locations where cable service loops are required.</p> <p>(c) Additional Type A chambers where Traffic Scotland equipment site is not adjacent to the Type A chambers detailed in (a) above.</p> <p>(d) Additional Type A chambers for cable access shall also be constructed wherever the associated ducts change level or direction.</p> <p>(e) Type A or Type B chambers shall also be constructed as required to accommodate local ducting containing Electricity supply or Private wire interface cables.</p> <p>4. Roadside Loop Chambers shall be installed in the verge adjacent to each Traffic Scotland TSDS vehicle classification detection site.</p> <p>5. Foundations to chambers shall be of mix ST4 concrete in accordance with Clause 2602.</p> <p>6. Brickwork shall comply with the 2400 Series and be built with mortar designation (i) in English bond. The joints of brickwork where exposed shall</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1532 SR (continued)	<p>be finished as specified for un-pointed joints in Clause 2412. The ends of all ducts shall be neatly built into the brickwork and finished flush with mortar designation (i).</p> <ol style="list-style-type: none"> <li>7. Chambers not exceeding 1.3 metres in depth to invert may be constructed from complete plastic units or other units in equivalent material. Where the units do not meet the loading requirements of BS 5911-3 and BS EN 1917, they shall be surrounded by 150 mm of mix ST4 concrete. Where preformed plastic chambers are used with duct entries then correctly located round duct access holes shall be core cut to provide a clearance fit on each duct. The outer surface of the ducts shall be sealed against the chamber wall using epoxy putty or similar as required by the manufacturer's instructions. No more than 6 off 100mm diameter ducts shall enter on a single wall. Unless otherwise agreed with the Overseeing Organisation plastic chambers shall be installed in accordance with, the manufacturer's instructions and this Series 1500. <li>8. Where the depth of invert of chambers exceeds 900 mm below the finished surface of the carriageway or the adjacent ground, manhole steps complying with BS EN 13101 shall be built in as specified in BS EN 1917. Steelwork fittings shall comply with BS 970: Part 1 and be galvanised in compliance with Clause 1909 after fabrication. Threaded components shall be galvanised in compliance with Clause 1909. <li>9. Excavation around chambers shall be backfilled with general fill materials as described in Table 6/1 and compacted in compliance with Clause 612. Where mechanical compaction is impracticable, the excavation shall be backfilled with mix ST2 concrete complying with Clause 2602. Where there are pre-cast concrete access shafts to pre-cast or similar concrete chambers, the shafts shall be surrounded by a minimum thickness of 150 mm of mix ST4 concrete, and the remaining excavation backfilled with general fill material as described in Table 6/1 compacted in compliance with Clause 612. <li>10. Chamber covers and frames shall be as described in the Employer's Requirements and shall comply with BS EN 124. Special duty covers for use in carriageways and other special situations shall be as agreed with the Overseeing Organisation. <li>11. A concrete apron shall be provided at all Traffic Scotland chambers in accordance with the NDX Drawings. Such aprons shall be constructed to provide adequate surface run-off and should generally be arranged to form a continuous and level hard-standing area joining with the access pathway and other such adjacent paved or concrete aprons. Under no circumstances should the chamber apron form any part of safety fence foundations or similar civil's construction. <li>12. Four sets of lifting keys shall be delivered to the Employer for each type of cover supplied. Additionally, a suitable cover lifter shall be delivered to the Employer.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1532 SR (continued)	<p>13. Frames for chamber covers shall be set in cement mortar designation (i) complying with Clause 2404 or a suitable proprietary quick setting mortar of equivalent strength.</p> <p>14. Chambers shall be constructed with a sump as shown NDX Drawings. This sump shall be constructed to drain into a soak away immediately below the chamber. It is a requirement of this specification that the chamber drainage is adequate to minimise the accumulation of water in the chamber. Under no circumstances should running water be allowed to drain through the chambers.</p> <p>15. Traffic Scotland Chambers shall be clearly identified by the legend "MOTORWAY COMMUNICATIONS"; the lettering shall be 25 mm high and shall be embossed into each cover. Where covers have a concrete infill a plate manufactured from a non-corrodible metal or steel, galvanised in accordance with Clause 1909, shall be cast into the concrete flush with the concrete surface.</p> <p>16. Chamber infrastructure requirements for future use by third party providers of broadband services shall be as per the requirements of the Traffic Scotland Equipment chambers. Chambers shall be used solely for third party providers of broadband services and shall be identified as such by an appropriate legend on each chamber cover.</p>
1534 SR	<p>Closed Circuit Television</p> <p>1. Closed Circuit Television (CCTV) typically consists of cameras, associated masts, Pan Tilt and Zoom (PTZ) units, camera mast cables and video transmission equipment. Video transmission equipment where provided shall be housed in a local associated cabinet. For IP enabled CCTV cameras this transmission equipment is typically integrated into the camera itself.</p> <p>2. The Contractor shall design and install a camera mast foundation in accordance with the standards detailed in the mast manufacturer's instructions, the Employer's Requirements and typically described in the NDX1010 Series drawings.</p> <p>3. Sites shall be designed and configured to enable safe maintenance and access. Larger CCTV cameras, typically supported on masts incorporating a raise-lower carriage while for smaller cameras the mast shall be of a fold-down design. Typically such fold-down masts shall be of open lattice construction. Suitable hard-standing shall be provided to accommodate access to both the mast base and the mast top mounted equipment when in the maintenance position.</p>
1537 SR	<p>Data Service (<i>SRTDb Detectors and SRTDb Equipment</i>)</p> <p>1. Data Services equipment comprises loop detectors providing vehicle parameters for all lanes and in both directions together with Data Service vehicle counting equipment. Unless otherwise described in the Employer's Requirements the Data Service site is typically co-located with CCTV equipment to form a composite roadside site. An example of such a site is</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1537 SR (continued)	<p>shown in NDX1010-01 where in addition to Traffic Scotland Data Service detection equipment a CCTV has been located.</p> <ol style="list-style-type: none"> 2. Where a standalone Data Service site is required the Contractor shall inter alia provide all power, cabinets, equipment protection and hard landscaping. 3. The Data Service Detectors and associated equipment shall be provided as described in the Employer's Requirements and this Scottish Series 1500. 4. Standalone Data Service equipment shall be typically installed within a specialist employer issued cabinet, which shall be suitably located and protected in full compliance with TD19/06. 5. A typical Type D chamber shown in drawing NDX1063-04 shall be provided adjacent to the cabinet for loop tail stowage and optional jointing. The method of jointing, where required, shall be agreed with the Overseeing Organisation.
1670AR	<p>Static Load Testing of Piles</p> <ol style="list-style-type: none"> 1) Further to Clause 1609: <ol style="list-style-type: none"> a) The Company shall undertake a pile load testing programme that: <ol style="list-style-type: none"> i) is consistent with section 7.5 of BS EN 1997-1:2004 ii) is consistent with the recommendations given in section C15 of the Guidance Notes in Part C of the ICE Specification for Piling and Embedded Walls 2nd Edition iii) takes due account of the range of ground conditions encountered at the foundation locations b) As a minimum this shall include a maintained load test on at least one full size instrumented preliminary trial pile of the largest diameter proposed to at least the calculated ultimate resistance to validate the design method adopted. The preliminary trial pile(s) shall be constructed using the same equipment and techniques that are adopted for the works piles. 2) Trial piles shall be instrumented with strain gauges and extensometers with an appropriate degree of redundancy such that the load distribution down the pile during the test can be determined. 3) Static load testing using the bi-directional method is permitted. If the Company proposes to adopt the bi-directional method full details of the design and construction of the preliminary trial pile(s) and associated instrumentation shall be given in Appendix 16/9. This shall include: <ol style="list-style-type: none"> a) the test procedure and load increments to be adopted; b) the measurements that will be made during the test; and c) the method to be used to interpret the results of the test.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1670AR (continued)	<p>4) Preliminary trial piles shall be constructed and tested sufficiently in advance of the main works for the results to be evaluated and the design modified if necessary.</p> <p>5) A report on the preliminary pile tests shall be submitted which shall include all the information required in sub Clauses 36 and 37 of Clause 1609 together with an interpretation of the results and any implications for the pile design.</p> <p>6) Preliminary trial piles are not permitted to be incorporated into the Permanent Works.</p> <p>7) The Company shall complete Appendix 16/9 to include</p> <ol style="list-style-type: none"> a) the overall pile testing strategy in relation to verification of the pile design and partial resistance factors and model factors to be adopted; b) the numbers and types of static load tests to be carried out; c) the proposed locations of preliminary trial piles; d) whether additional location specific ground investigation is required; e) the programme for installation and testing; and f) details of the instrumentation to be installed.
1671AR	<p>Pile Integrity Tests</p> <p>1) Pile Integrity Tests</p> <p>Further to Clause 1608:</p> <ol style="list-style-type: none"> a) The Company shall carry out a programme of integrity testing of all piles. This shall include use of one or more of the following method on all piles: <ol style="list-style-type: none"> i) Impulse Method; ii) Sonic Echo Frequency Response or Transient Dynamic steady state vibration method. b) In addition to the above, enhanced integrity testing shall be undertaken as follows: <ol style="list-style-type: none"> i) Cross hole sonic logging in bored cast in situ piles over the full length of the shaft. The number of logging tubes shall be not less than 2.5 times the pile diameter in metres with a minimum of four. ii) Coring of the lower part of the concrete shaft and contact between the pile base and rock in rock socket piles where end bearing resistance is considered in the design. The coring shall be used to demonstrate the cleanliness of the contact (concrete to rock) and that the rock is undisturbed. Core recovery shall be 100%. Core dimensions shall be at least 0.5 metres of concrete, 1.5 metres of rock both with a diameter of at least 100 millimetres. The resulting bore shall be backfilled with cement grout. This requirement is in addition to that in Clause 1673 AR below. iii) The Company shall complete Appendix 16/8 with detailed scope of integrity testing.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1671AR (continued)	<p>iv) As a minimum, piles shall be tested at a frequency of one in every four piles, or one per discrete foundation (pile cap), whichever is greater.</p> <p>2) Dynamic Pile Testing</p> <p>Further to Clause 1608:</p> <p>a) If dynamic pile testing is proposed it shall be calibrated against static load tests carried out on comparable piles (i.e. of the same type and similar size constructed in similar ground conditions at the same site using the same installation criteria). Restrike tests shall be carried out unless it has been demonstrated that relaxation following the end of driving is not significant.</p> <p>b) The limitations of dynamic pile testing set out in section C14 of the Guidance Notes in Part C of the ICE Specification for Piling and Embedded Walls 2nd Edition shall be taken into account.</p> <p>3) Quasi Static (Rapid Loading) Pile Testing</p> <p>a) If quasi static testing is proposed to be used it shall be calibrated against static load tests carried out on comparable piles (i.e. of the same type and similar size constructed in the same ground conditions at the same site using the same installation criteria).</p> <p>b) The limitations of quasi static pile testing set out in section C14 of the Guidance Notes in Part C of the ICE Specification for Piling and Embedded Walls 2nd Edition shall be taken into account.</p>
1672AR	<p>Drilling Fluid</p> <p>1) If drilling fluid other than water is proposed for bored piles, constructed to the Company shall include in Appendix 16/18 details of the methods to be adopted to avoid contamination of the ground. The use of drilling fluid other than water shall only be permitted where the Company has obtained prior approval from the Scottish Environment Protection Agency (“SEPA”).</p>
1673AR	<p>Ground Investigation</p> <p>1) If rock socket piles are required to mobilise base resistance under reversible or irreversible serviceability limit state (“SLS”) load combinations, borehole(s) shall be made at each discreet location prior to pile construction to verify the rock quality at the proposed founding level. Continuous cores shall be recovered from two pile diameters above pile toe level to two pile diameters below pile toe level and appropriate in situ and / or laboratory testing carried out. Core diameter shall be at least 100 millimetres. The resulting bore shall be backfilled with cement grout.</p> <p>2) As a minimum, piles shall have borehole(s) at a frequency of one borehole for every ten piles, or two boreholes per discrete foundation (pile cap), whichever is greater. This frequency shall increase if the results of rock coring or works pile construction show significant variability.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text																																		
1728 AR	<p>1. Construction Tolerances in Structural Concrete</p> <p>(i) General</p> <p>Notwithstanding any tolerances stated in the DMRB, British and European Standards the following tolerances shall be adopted in the Design, Construction, Completion and Maintenance of the Works.</p> <p>1.1 In-Situ Concrete</p> <p>(i) The maximum deviation of hardened concrete surfaces prior to the removal of formwork shall not be greater than 3 millimetres in 3 metres (which tolerance shall not be cumulative) nor greater than 2 millimetres in 1 metre. Of the foregoing deviations, not more than 2 millimetres shall occur at a formwork joint. The overall standard of workmanship to be achieved shall be such that the lines of the finished surfaces shall be smoothly continuous.</p> <p>(ii) Where concrete surfaces are not permanently exposed, the maximum deviation of the finished concrete surfaces shall not be greater than 6 millimetres in 3 metres (which tolerance shall not be cumulative).</p> <p>1.2. Precast Concrete</p> <p>(i) For members other than pre-stressed pre-tensioned members, the length, cross-section dimensions, straightness, squareness, twist and flatness of precast concrete shall be measured at 28 ± 2 days after casting. Unless otherwise stated, the allowable dimensional variations shall not exceed the following:</p> <table> <thead> <tr> <th>a) Length</th> <th>Variation</th> </tr> </thead> <tbody> <tr> <td>Up to 3 metres</td> <td>± 6 mm</td> </tr> <tr> <td>3 to 4.5 metres</td> <td>± 9 mm</td> </tr> <tr> <td>4.5 to 6 metres</td> <td>± 12 mm</td> </tr> <tr> <td>Additional for every subsequent 6 metres</td> <td>± 6 mm</td> </tr> <tr> <th>b) Cross section (each direction)</th> <th></th> </tr> <tr> <td>Up to 500 mm</td> <td>± 6 mm</td> </tr> <tr> <td>500 to 750 mm</td> <td>± 9 mm</td> </tr> <tr> <td>Additional for every subsequent 250 mm</td> <td>± 3 mm</td> </tr> <tr> <th>c) Straightness or bow (deviation from intended line)</th> <th></th> </tr> <tr> <td>Up to 3 metres</td> <td>± 6 mm</td> </tr> <tr> <td>3 to 6 metres</td> <td>± 9 mm</td> </tr> <tr> <td>6 to 12 metres</td> <td>± 12 mm</td> </tr> <tr> <td>Additional for every subsequent 6 metres</td> <td>± 6 mm</td> </tr> <tr> <th>d) Squareness. When considering the squareness of a corner, the longer of the two adjacent sides being checked shall be taken as the base line. The shorter side shall not vary in its distance from a perpendicular so that the difference between the greatest and shortest dimensions exceeds the following:</th> <th></th> </tr> <tr> <td>Length of shorter sides:</td> <td></td> </tr> <tr> <td>Up to and including 1.2 metres</td> <td>6 mm</td> </tr> </tbody> </table>	a) Length	Variation	Up to 3 metres	± 6 mm	3 to 4.5 metres	± 9 mm	4.5 to 6 metres	± 12 mm	Additional for every subsequent 6 metres	± 6 mm	b) Cross section (each direction)		Up to 500 mm	± 6 mm	500 to 750 mm	± 9 mm	Additional for every subsequent 250 mm	± 3 mm	c) Straightness or bow (deviation from intended line)		Up to 3 metres	± 6 mm	3 to 6 metres	± 9 mm	6 to 12 metres	± 12 mm	Additional for every subsequent 6 metres	± 6 mm	d) Squareness. When considering the squareness of a corner, the longer of the two adjacent sides being checked shall be taken as the base line. The shorter side shall not vary in its distance from a perpendicular so that the difference between the greatest and shortest dimensions exceeds the following:		Length of shorter sides:		Up to and including 1.2 metres	6 mm
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APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text								
1728 SR (continued)	<table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">Over 1.2 metres but less than 1.8 metres</td> <td style="width: 40%; text-align: right;">9 mm</td> </tr> <tr> <td>1.8 metres and over</td> <td style="text-align: right;">12 mm</td> </tr> </table> <p>When considering squareness, any error due to lack of straightness shall be ignored; squareness shall be measured with respect to the straight lines that are closest to parallel with the features being checked.</p> <p>When the nominal angle is other than 90°, the included angle between check lines shall be varied accordingly.</p> <p>e) <i>Twist</i>. Any corner shall not be more than the deviation stated from the plane containing the other three corners:</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">Up to 600 mm wide and up to 6 metres in length</td> <td style="width: 40%; text-align: right;">6 mm</td> </tr> <tr> <td>Over 600 mm wide and for any length</td> <td style="text-align: right;">12 mm</td> </tr> </table> <p>f) <i>Flatness</i>. The maximum deviation from a 1.5 metre straight edge placed in any position on a nominally plane surface shall not exceed 6 mm.</p> <p>In addition, for members where accuracy is important, for example those which form bridge deck copes, the allowable dimensional variations and deviations shall not exceed half the values listed above.</p> <p>2. Assembly and Erection of Precast Concrete Members other than Prestressed Pretensioned Members</p> <p>(i) The vertical alignment of the member shall not depart from the Design level along the line by more than ± 5mm nor more than 3mm in a distance of 3 metres, nor greater than 2mm in 1 metre.</p> <p>(ii) The horizontal alignment of the member shall not depart from the Design alignment along the line where accuracy is important by more than ± 5mm nor more than 3mm in a distance of 3 metres, nor greater than 2mm in 1 metre.</p> <p>(iii) At the joints between adjacent members, the difference in level at the point where accuracy is important shall not exceed 2mm.</p> <p>(iv) At the joints between adjacent members, the difference in horizontal alignment at the point where accuracy is important shall not exceed 2mm.</p> <p>(v) The width of gaps between adjacent members shall be as uniform as possible.</p> <p>(vi) The erection procedure shall incorporate means of accurately locating members in their final position. The procedure shall also incorporate means of making fine adjustments to the level and alignment of the units after installation.</p>	Over 1.2 metres but less than 1.8 metres	9 mm	1.8 metres and over	12 mm	Up to 600 mm wide and up to 6 metres in length	6 mm	Over 600 mm wide and for any length	12 mm
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APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1771 AR	<p>1 Couplers</p> <p>1.1 The use of threaded mechanical couplers is acceptable subject to:</p> <ul style="list-style-type: none"> a) The Contractor shall submit the source and suppliers to the Overseeing Organisation for agreement; b) Manufacturers and suppliers shall hold a relevant valid CARES certificate of approval unless otherwise agreed by the Overseeing Organisation; c) All couplers shall be covered by a relevant CARES Technical Approval or other relevant product approval from an appropriate UKAS accredited product certification body; and d) Concrete cover shall be maintained. <p>1.2 Tensile Capacity</p> <p>1.2.1 The tensile strength of the coupled bar should exceed 540 newtons per square millimetre for BS 4449+A3 grade B500B or Grade B500C hot rolled reinforcement steel.</p> <p>1.3 Slip (permanent elongation test)</p> <p>1.3.1 When a test is made of a representative gauge length assembly comprising reinforcement size, grade and profile to be used and a coupler of the precise type to be used, the permanent elongation after loading to $0.6f_y$ shall not exceed 0.1 millimetres.</p> <p>1.4 Fatigue</p> <p>1.4.1 The Contractor shall obtain from the coupler manufacturer the fatigue design S-N curve established as defined below, which he shall furnish to the Designer, Checker and Overseeing Organisation with the Design Documentation. Existing fatigue design S-N data may be taken as an acceptable alternative.</p> <p>1.5 Performance testing</p> <p>1.5.1 The material to be used for the performance tests shall be in all respects similar to those which the Contractor proposes to use in the Works.</p> <p>1.5.2 Mechanical connections shall be qualified for use in the construction on the basis of the following performance tests:</p> <p>1.6 Static tensile strength tests</p> <p>1.6.1 A minimum number of six static tensile strength tests shall be conducted considering the range of all variables. All test samples shall meet the requirements of sub Clause 1.2 above.</p> <p>1.7 Slip testing</p> <p>1.7.1 A minimum number of two slip tests shall be conducted considering the range of variables. All test samples shall meet the requirements of sub-Clause 1.3 above.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text																				
<p>1771 SR (continued)</p>	<p>1.8 Fatigue testing</p>																				
	<p>1.8.1 Sampling</p>																				
	<p>1.8.1.1 Couplers shall be formed into batches of 20 bars of a single type and size, manufactured at the same time. All couplers of the same diameter should preferably be from the same melt. If not, the melt of each test specimen should be known and there should be a representative number of couplers from each melt.</p>																				
	<p>1.8.1.2 Each test specimen shall be selected at random from the batches and shall be representative of the production run.</p>																				
	<p>1.8.2 Testing</p>																				
	<p>1.8.2.1 The fatigue properties for each coupler size shall be established by a competent testing laboratory complying with the requirements Schedule 2 of the Works Requirements.</p>																				
	<p>1.8.2.2 Test specimens shall be tested in air under axial tensile loading using tapered grips and a suitable gripping medium.</p>																				
	<p>1.8.2.3 Testing shall be carried out under load control and stress shall be calculated using nominal cross-sectional area.</p>																				
	<p>1.8.2.4 Tests shall be performed for couplers for reinforcing bar diameters 25 millimetres, 32 millimetres, 40 millimetres on BS 4449+A3 grade B500B or grade B500C.</p>																				
	<p>1.8.2.5 The number of load cycles per test shall be performed until failure.</p>																				
	<p>1.8.2.6 The frequency of testing shall be in the range 5 to 10 hertz.</p>																				
	<p>1.8.2.7 The samples of all diameters shall be tested at the following stress ranges (all newtons per square millimetre):</p>																				
	<table border="1"> <thead> <tr> <th>Stress Range</th> <th>Max Stress</th> <th>Min Stress</th> <th>Mean Stress</th> </tr> </thead> <tbody> <tr> <td>400</td> <td>450</td> <td>50</td> <td>250</td> </tr> <tr> <td>300</td> <td>400</td> <td>100</td> <td>250</td> </tr> <tr> <td>200</td> <td>350</td> <td>150</td> <td>250</td> </tr> <tr> <td>160</td> <td>360</td> <td>200</td> <td>280</td> </tr> </tbody> </table>	Stress Range	Max Stress	Min Stress	Mean Stress	400	450	50	250	300	400	100	250	200	350	150	250	160	360	200	280
	Stress Range	Max Stress	Min Stress	Mean Stress																	
400	450	50	250																		
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<p>1.8.2.8 The S-N curves shall be presented as straight lines, using a log-log scale of stress versus number of cycles to failure. They shall be based upon standard statistical regression analysis methods and give the 97.5 per cent confidence of survival.</p>																					
<p>1.8.3 Frequency of Testing</p>																					
<p>1.8.3.1 3 samples shall be tested for each bar / coupler size and stress range; giving a total number of 12 sets of tests per bar / coupler size.</p>																					

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1772 AR	<p>1 Concrete Repairs – General Requirements</p> <p>1.1 Storage of Materials</p> <p>1.1.1 All proprietary materials shall be stored in a dry weatherproof lock up store free from extremes of cold or heat in accordance with the manufacturer’s written instructions. The materials shall not be removed from the store for use until immediately prior to mixing.</p> <p>1.2 Records</p> <p>1.2.1 As repair work proceeds the Contractor shall keep records including date stamped photographs. Records shall be held in accordance with the procedures in the Quality Plan and be available for inspection by the Engineer.</p> <p>1.3 High Pressure Water Jetting</p> <p>1.3.1 High pressure water jetting shall use clean and fresh potable water which complies with the requirements of BS EN 1008. The Contractor shall not add antifreeze agents or any other chemicals.</p>
1773 AR	<p>1 Removal of Concrete in Areas to be Repaired</p> <p>1.1 Requirements for the Removal of Concrete</p> <p>1.1.1 The Contractor shall cut out and remove concrete from areas specifically identified following inspection and testing.</p> <p>1.1.2 Concrete shall be removed from the area until sound concrete is reached. Where reinforcement becomes exposed concrete shall be removed for a minimum distance of 25 millimetres beyond the rear face of the reinforcement. Where corroded reinforcement is identified the area of concrete removed shall be extended to expose 100 millimetres of uncorroded reinforcement in all directions.</p> <p>1.1.3 Before cutting out the Contractor shall determine the position and depth of the reinforcement. The perimeter of the concrete to be removed shall be saw cut perpendicularly to the face of the concrete to a depth of not less than 15 millimetres or to within 10 millimetres of the reinforcement, whichever shall be the lesser.</p> <p>1.1.4 At the upper limits of repairs to be made using repair concrete, sloping cuts may be used to avoid the entrapment of air when the concrete is poured.</p> <p>1.1.5 The saw cut edges shall be abraded by grit blasting or equivalent methods.</p> <p>1.1.6 The concrete shall be removed by the use of suitable hand or mechanical tools or high pressure water jetting. Removal of concrete by water jetting shall be carried out by firms who are registered members of the Association of High Pressure Water Jetting Companies.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1773 SR (continued)	1.1.7 Where concrete is removed by high pressure water jetting a lightweight electric or pneumatic chipping hammer may be used for final trimming of the area broken out.
	1.1.8 Overbreak of concrete shall be made good using a concrete repair system selected from Clause 1775AR.
	1.1.9 Reinforcement damaged during concrete removal shall be made good. Existing reinforcement which has corroded or is otherwise damaged shall be removed and additional steel reinforcement shall be lapped or welded onto the existing reinforcement. All such welding shall be in accordance with Clause 1717. All loose reinforcement shall be securely tied with stainless steel tying wire.
	1.1.10 The Site shall be kept free of debris or standing water arising from the high pressure water jetting activities.
	1.1.11 On completion of removal of concrete all concrete surfaces and exposed reinforcement which shall be in contact with repair materials shall be prepared in accordance with Clause 1774AR.
1774 AR	1 Surface Preparation
	1.1 General Requirements
	1.1.1 Blast cleaning - The Contractor shall ensure that the grade and particle shape of abrasives is adequate to achieve the appropriate standard of cleanliness. Non-metallic abrasives shall not be recycled.
	1.1.2 Water for cleaning - Only clean cold water which complies with the requirements of BS EN 1008 shall be used for cleaning and rinsing.
	1.2 Preparation of Surfaces of Reinforcement
	1.2.1 Standard - Bright steel
	1.2.2.1 Removal of all detrimental contamination and corrosion products to produce a generally bright appearance overall. The surfaces shall be free of embedded abrasive particles and corrosion products when viewed through a X10 illuminated magnifying glass.
	1.2.2 Method
	1.2.2.1 Blast cleaning using dry air / abrasive system, or
	1.2.2.2 Wet blast cleaning using a low pressure air / water / abrasive system. The equipment shall not allow the air / water pressure to exceed 14 bar and shall incorporate a metering device to allow the abrasive quantity introduced to be adjusted from 0 to 14 bar.
	1.2.2.3 Within an hour of cleaning the treated reinforcement shall be pressure washed with clean water.
1.3 Preparation of Surfaces of Concrete	
1.3.1 Standard	
1.3.1.1 Concrete surfaces shall be clean and dry and free of cement laitance contaminants and loose friable material. The surface shall be wetted	

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
<p>1774 SR (continued)</p>	<p>one hour before repair concrete is applied. There shall be no standing water. The surface shall be such that repair concrete shall flow freely into all voids and be in intimate contact with the existing concrete.</p> <p>1.3.2 Method</p> <p>1.3.2.1 High Pressure Water Jet</p> <p>The surface profile after cutting out shall be irregular with aggregate particles projecting above the surrounding concrete matrix.</p> <p>1.3.2.2 Hand or Mechanical Tools</p> <p>All concrete surfaces to receive repair materials exposed by percussive methods using hand or mechanical tools shall be prepared by grit blasting or high pressure water jetting to remove all fractured or “bruised” concrete surfaces to expose sound aggregate particles.</p> <p>1.4 Procedure Trials</p> <p>1.4.1 The Contractor shall remove, cut back and prepare the surface of an area of one square metre of concrete to be repaired as a trial of the methods proposed for carrying out the work and obtain a photographic record for inspection by the Engineer.</p>
<p>1775 AR</p>	<p>1 Concrete Repairs</p> <p>1.1 General</p> <p>1.1.1 Concrete repairs shall be carried out using either normal flow concrete, proprietary repair mortar, high-flow repair concrete, proprietary sprayed concrete, or a proprietary repair system proposed by the Contractor and subject to consent in writing by the Engineer.</p> <p>1.1.1.1 Crack repairs carried out by a resin injection system shall be proposed by the Contractor and subject to consent in writing by the Engineer.</p> <p>1.1.2 Proprietary repair materials and systems shall have an Agrément Board Roads and Bridges Certificate registered with the Department for Transport / Highways Agency.</p> <p>1.1.3 Proprietary repair mortars shall be used for repair areas less than or equal to 1 metre squared or repair depths less than or equal to 30 millimetres deep. Normal flow concrete or high flow concrete or sprayed concrete shall be used for repair areas greater than 1 metre squared or greater than 30 millimetres deep or as otherwise proposed by the Contractor and subject to consent in writing by the Engineer.</p> <p>1.2 Repairs Using Normal Flow Concrete</p> <p>1.2.1 Repair concrete shall be a designed mix for special structural concrete as defined in Clauses 1701 and 1705 of the Specification.</p> <p>1.2.2 Cement content shall be not less than 400 kilograms per cubic metre or more than 550 kilograms per cubic metre.</p> <p>1.2.3 Maximum aggregate size shall be 20 millimetres.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1775 AR (continued)	1.2.4 The free water / cement ratio shall not be greater than 0.4.
	1.2.5 The minimum 28 day compressive strength shall be 40 newtons per square millimetre.
	1.2.6 Alkali – silica reaction shall be controlled as specified in Clause 1704.5.
	1.3 Repairs Using Proprietary Repair Mortar
	1.3.1 Prebatched polymer modified cementitious mortars incorporating a shrinkage reduction agent shall be used.
	1.3.2 Mortars for hand screeding of surfaces to be waterproofed shall be sand/cement mortar containing styrene acrylate or styrene butadiene polymer bonding mixture.
	1.3.3 The free water / cement ratio shall be not greater than 0.4.
	1.3.4 The maximum aggregate grain size in the mortar shall be suitable for the depths of repair required.
	1.3.5 Water required to mix repair mortars shall comply with the requirements of BS EN 1008.
	1.3.6 The cement content shall be not less than 400 kilograms per cubic metre or more than 550 kilograms per cubic metre.
	1.3.7 The maximum total chloride content expressed as % of chloride ion by mass of cement of the materials shall not exceed 0.3%. The total chloride ion content of the materials for repairs to prestressed or heat cured concrete shall not exceed 0.1 per cent of the weight of cement. Calcium chloride or admixtures containing chloride salts shall not be used.
	1.3.8 The minimum 28 day strength of the mortar shall be 40 newtons per square millimetre. Alkali-silica reaction shall be controlled as specified in Clause 1704.5 of the Specification.
	1.4 Delivery and Storage of Material
	1.4.1 The Contractor shall supply with each batch of the material delivered to the Works certificates furnished by the supplier stating: <ul style="list-style-type: none"> a) the polymer used; b) evidence that the chloride contents are less than specified in sub-Clause 1.3.7 above; c) the content of sodium oxide equivalent in the mortar; d) Maximum shelf life; and e) Handling arrangements.
	1.4.2 The material shall be stored in a dry environment free from extremes of cold and heat and any specific storage requirements of the manufacturers; and

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1775 AR (continued)	1.4.3 The materials shall not be removed from the store for use until immediately prior to mixing.
	1.5 Placing Repair Mortar
	1.5.1 The repair shall be built up in layers in accordance with the repair mortar manufacturer's written instructions. The surface of each layer except the final layer shall be scored to provide a key for the next layer.
	1.5.2 The repair mortar shall be suitable for the purpose intended i.e. for soffits or vertical surfaces as appropriate.
	1.5.3 Repair mortar shall not be applied when the temperature of the surface to be repaired falls below five degrees Celsius.
	1.5.4 The material shall be incorporated within one hour of mixing or such lesser period as stated in writing by the manufacturer.
	1.5.5 Repair mortar shall be cured in accordance with sub-Clause 1710.5 and the manufacturer's written instructions. During the curing period the temperatures of the repair mortar shall be maintained at or above five degrees Celsius by artificial means if necessary.
	1.6 Surface Finish to Repair Mortar
	1.6.1 Repair mortar shall be float finished to produce a dense smooth uniform surface free from float marks to the specified line and level.
	1.7 Repairs Using High-Flow Repair Concrete
	1.7.1 Materials
	1.7.1.1 Cement shall comply with Clause 1702.
	1.7.1.2 Cement content shall be not less than 400 kilograms per cubic metre or more than 550 kilograms per cubic metre.
	1.7.1.3 Alkali-silica reaction shall be controlled as specified in Clause 1704.
	1.7.1.4 The total chloride ion content of the materials shall not exceed 0.1% of the weight of cement. Any chloride or admixtures containing chloride salts shall not be used.
	1.7.1.5 Aggregate shall be well graded with the maximum size not exceeding eight millimetres except when pumping is to be employed when the maximum size shall not exceed 6 millimetres and shall comply with sub-Clause 1702.2.
	1.7.1.6 Proprietary material shall be of such composition and grading that when mixed with water a flowable concrete is produced which shall flow freely into the confined spaces to be filled and shall not be prone to segregation bleeding or cracking in either the plastic or hardened state.
1.7.1.7 Combinations and additions may comprise pulverised fuel ash ground granulated blast furnace slag microsilica plasticisers aggregate	

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text										
1775 AR (continued)	<p>suspension agents and shrinkage reduction agents. Calcium chloride or admixtures containing chloride salts shall not be used.</p> <p>1.7.1.8 Microsilica content shall not exceed five per cent of the mass of the cement. Microsilica shall comply with Table 17/70.</p> <p>TABLE 17/70 MICROSILICA CONTENT</p> <table border="1"> <thead> <tr> <th>Item</th> <th>Limit (by mass)</th> </tr> </thead> <tbody> <tr> <td>Silica content (SiO₂)</td> <td>minimum 85%</td> </tr> <tr> <td>Alkali content (NaO₂)</td> <td>maximum 2%</td> </tr> <tr> <td>Carbon</td> <td>maximum 2%</td> </tr> <tr> <td>Proportion passing 50 micron sieve</td> <td>minimum 99%</td> </tr> </tbody> </table> <p>1.7.1.9 Water shall comply with the requirements of BS EN 1008.</p> <p>1.7.1.10 The specified minimum 28 day strength of the concrete shall be not less than 40 newtons per square millimetre. The maximum free water / cement ratio shall not exceed 0.4.</p> <p>1.7.2 Delivery and Storage of Material</p> <p>1.7.2.1 Records shall be kept of each batch of material delivered to the site of the Works in accordance with the procedures in the Quality Plan and shall include:</p> <ol style="list-style-type: none"> a) formulator's name and address; b) formulator's agent's name and address where applicable; c) material identification; d) batch reference number size of batch and number of containers in the delivery; e) date of manufacture; f) evidence that the chloride contents are less than specified in sub-Clause 7(iv) above; g) details of the significant rock components contained in the aggregates; h) cement content; i) combinations and additions used; and j) The equivalent sodium oxide content. <p>1.7.2.2 Containers shall be damp proof and readily emptied of their contents</p> <p>1.7.2.3 Containers shall be marked with the following information:</p> <ol style="list-style-type: none"> a) material identification; b) batch reference number; c) formulator's name; d) net weight and lifting arrangements and storage specific requirements; and 	Item	Limit (by mass)	Silica content (SiO ₂)	minimum 85%	Alkali content (NaO ₂)	maximum 2%	Carbon	maximum 2%	Proportion passing 50 micron sieve	minimum 99%
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APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1775 AR (continued)	<p>e) Any warnings or precautions concerning the contents.</p> <p>1.7.2.4 The material shall be stored in a dry environment free from extremes of cold and heat.</p> <p>1.7.2.5 Material shall not be older than three months or a lesser period specified by the formulator when used in the Works.</p> <p>1.7.2.6 The materials shall not be removed from the store for use in the Works until immediately prior to mixing.</p> <p>1.7.3 Formwork Site Mixing Placing and Curing</p> <p>1.7.3.1 Formwork shall be Class F3 to sub-Clause 1708.4 with the perimeter of the repair well sealed to prevent grout loss. Release agents shall be compatible with proposed surface treatments.</p> <p>1.7.3.2 Mixing in a forced action paddle mixer and placing shall be carried out strictly in accordance with the formulator's written instructions together with the following additional conditions:</p> <p>a) The free water cement ratio shall not exceed 0.4. The water content shall be determined during approval tests and maintained for batch tests works tests and in the Works within ± 2 per cent of the agreed content.</p> <p>b) No extra water shall be added after the original mixing.</p> <p>c) The material shall be incorporated in the Works within 20 minutes of completion of mixing or such lesser period as stated by the formulator. The concrete shall be continuously agitated after the mixing and before placing.</p> <p>d) The material shall not be mixed or placed in the Works at ambient temperatures lower than five degrees Celsius or where the surface temperature of the concrete in the repair void is less than five degrees Celsius.</p> <p>e) The concrete when placed shall have a temperature of not less than five degrees Celsius and not more than 20 degrees Celsius.</p> <p>f) The surface temperature of the concrete shall be maintained at not less than five degrees Celsius until the concrete reaches a strength of 10 newtons per square millimetre as determined by tests on cubes cured under similar conditions to the structural concrete. Heat shall not be applied direct to any concrete.</p> <p>g) Repair concrete shall not be placed against other concrete which has been in position for more than 30 minutes unless a construction joint is formed in accordance with Clause 1710. In addition the joint surface shall be saturated for a minimum of 2 hours before concrete is placed against it. When repair concrete has been in place for four hours no further concrete shall be placed against it for a further 20 hours.</p> <p>h) Vibration shall not be used. The side shutters shall be tapped lightly with a hammer to expel surface air voids.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1775 AR (continued)	<p>1.7.3.3 Immediately after placing and for 14 days thereafter concrete shall be protected against harmful effects of weather including rain, rapid temperature changes and frost and from drying out. Impregnation may be carried out in accordance with the manufacturer's written instructions and not before 14 days as described in BD 43. Curing membranes shall not be used.</p> <p>1.7.3.4 When the mix proportions have been determined no variations shall be made in the manufacture supply mix proportions or method of mixing of the material.</p> <p>1.7.4 Approval Tests</p> <p>1.7.4.1 Before Works commence all properties of the proposed high-flow repair concrete shall be demonstrated by the Contractor and the formulator's representative by carrying out the tests specified below in an UKAS accredited laboratory. Records shall be maintained of all tests in accordance with the procedures in the Quality Plan.</p> <p>1.7.4.2 The composition of the high flow concrete including the source of water the mix proportions and the method of mixing shall be the same as that proposed for use in the Works. The composition shall not be varied throughout the course of the tests and the material shall be obtained from the same batch.</p> <p>1.7.4.3 The tests fall into two categories: flowability and compressive strength.</p> <p>1.7.4.4 The flowability tests shall demonstrate:</p> <ul style="list-style-type: none"> a) flow characteristics in a trough at five degrees Celsius and 20 degrees Celsius as specified in Note 1 below; and b) flow characteristics in a simulated soffit repair at five degrees Celsius and 20 degrees Celsius as specified in Note 2 below. <p>Note 1: The flow characteristics of the concrete in a trough shall be assessed. For each test the concrete and trough shall be at the specified temperature. The funnel of the apparatus shall be fitted with a rubber bung and charged with 6 litres of concrete. On release of the bung the concrete shall flow along the trough and the length of the flow along the trough shall be measured. A test shall consist of three readings the flow requirements shall be deemed to be satisfied if none of the readings is below 750 millimetres in 30 seconds without signs of segregation or bleeding.</p> <p>Note 2: The flow characteristics of the concrete in a simulated soffit repair shall be tested in accordance with BD27. For each test the concrete and apparatus shall be at the specified temperature. The concrete shall be poured in one operation into the supply tube until the level of the concrete has reached 100 millimetres above the underside of the top plate. After the concrete has set the specimen shall be removed from the apparatus and sawn into two parts and the sawn concrete surfaces shall be examined. The concrete shall be</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1775 AR (continued)	<p>homogeneous free from excessive air holes voids segregation and other defects and shall completely fill the simulated repair.</p> <p>1.7.5 Compressive Strength Tests</p> <p>1.7.5.1 Compressive strength tests shall be carried out to determine the compressive strength of the concrete at five degrees Celsius and 20 degrees Celsius. These shall conform to the requirements in BS 8500-2:2015 + A1:2016.</p> <p>1.7.5.2 Test cubes shall be made in 100 millimetres metal moulds to BS EN 12390-1:2012. The moulds shall be carefully filled by pouring concrete through a funnel to produce void free specimens. There shall be no compaction. The cubes shall be cured and tested in accordance with BS EN 12390-2:2012.</p> <p>1.7.5.3 The minimum compressive strength shall be established using a set of three cubes. The requirement shall be satisfied if none of the compressive strengths obtained is lower than the specified value and the difference between the highest and lowest values is not more than 20% of the average. Identity testing where required shall be carried out in accordance with Clause 1707.</p> <p>1.7.6 Batch Acceptance Test</p> <p>1.7.6.1 Each batch of material delivered to the Sites shall be tested as follows:</p> <ul style="list-style-type: none"> a) the material shall be taken at random from one or more containers from the same batch; b) flow through tests shall be carried out as specified in Note 1 of sub-Clause 1.7.4.4 above at 20 degrees Celsius; and c) Compressive strength tests shall be carried out as specified in sub-Clause 1.7.5 above at 20 degrees Celsius. <p>1.7.7 Site Tests</p> <p>1.7.7.1 Site tests shall be carried out to monitor:</p> <ul style="list-style-type: none"> a) flowability; and b) compressive strength. <p>1.7.7.2 The flowability of a sample of fresh concrete shall be determined in a trough as specified in sub-Clause 1.7.4.4 Note 1.</p> <p>1.7.7.3 The gain in strength of the repair concrete shall be monitored by testing cubes cured alongside the repaired areas at ambient temperature.</p> <p>1.7.7.4 For each days production of repair concrete six 100 millimetres cubes shall be made in accordance with sub-Clause 1.7.5 above. The cubes shall be cured for 24 hours in the moulds with the top surfaces covered by polythene sheets. After 24 hours the cubes shall be stripped and placed in polythene bags which shall be sealed. The cubes shall continue to be stored alongside the repaired areas throughout the curing period until required for testing. The cubes shall be crushed at times determined by the Contractor but at least two cubes shall be retained to be tested at 28 days.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text																
1775 AR (continued)	1.8 Repairs Using Proprietary Sprayed Concrete																
	1.8.1 Materials																
	1.8.1.1 The proprietary material shall be pre-weighed and pre-mixed at a location off the site of the Works.																
	1.8.1.2 Cement shall comply with Clause 1702.																
	1.8.1.3 Alkali-silica reaction shall be controlled as specified in Clause 1704.																
	1.8.1.4 The total chloride ion content of the materials shall not exceed 0.1% of the weight of cement. Any chloride or admixtures containing chloride salts as defined by sub-Clause 1702.2 shall not be used.																
	1.8.1.5 Aggregate shall be well graded with the maximum size not exceeding 3 millimetres and shall comply with sub-Clause 1702.2.																
	1.8.1.6 Combinations and additions may comprise pulverised fuel ash ground granulated blast furnace slag microsilica and plasticisers. Calcium chloride or admixtures containing chloride salts and expansion agents shall not be used.																
	1.8.1.7 The maximum sulphate content shall comply with sub-Clause 1704.6.																
	1.8.1.8 Material shall be capable of being applied to a thickness of 100 millimetres without the requirement for additional mesh reinforcement or fibres. Once placed it shall be capable of being profiled and trowel finished (to the equivalent of formed Class F3) without detrimental effects.																
	1.8.2 Performance Characteristics																
	1.8.2.1 The proprietary material shall have performance characteristics as detailed in Table 17/71 which are to be verified by an independent testing authority.																
	<p>TABLE 17/71: Performance Characteristics</p> <table border="1"> <thead> <tr> <th>TEST</th> <th>PERFORMANCE</th> </tr> </thead> <tbody> <tr> <td>Adhesion to concrete substrate</td> <td>greater than 2.0 newtons per square millimetre</td> </tr> <tr> <td>Characteristic strength of cores (28 days)</td> <td>40 newtons per square millimetre</td> </tr> <tr> <td>Tensile splitting strength (28 days)</td> <td>greater than 2.4 newtons per square millimetre</td> </tr> <tr> <td>Static Modulus of elasticity</td> <td>27000 ± 3000 newtons per square millimetre</td> </tr> <tr> <td>Shrinkage</td> <td>less than 0.002 per cent</td> </tr> <tr> <td>Coefficient of Thermal Expansion</td> <td>8 to 12 x 10⁻⁶/ degrees Celsius</td> </tr> <tr> <td>Coefficient of Chloride Ion Diffusion</td> <td>to be agreed with the Engineer</td> </tr> </tbody> </table>	TEST	PERFORMANCE	Adhesion to concrete substrate	greater than 2.0 newtons per square millimetre	Characteristic strength of cores (28 days)	40 newtons per square millimetre	Tensile splitting strength (28 days)	greater than 2.4 newtons per square millimetre	Static Modulus of elasticity	27000 ± 3000 newtons per square millimetre	Shrinkage	less than 0.002 per cent	Coefficient of Thermal Expansion	8 to 12 x 10 ⁻⁶ / degrees Celsius	Coefficient of Chloride Ion Diffusion	to be agreed with the Engineer
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APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1775 AR (continued)	<p>1.8.3 Delivery and Storage of Material</p> <p>1.8.3.1 Records shall be kept of each batch of material delivered to the Site and shall include:</p> <ul style="list-style-type: none"> a) formulator's name and address; b) formulator's agent's name and address where applicable; c) batch reference number size of batch and number of containers in the delivery; d) date of manufacture; e) evidence that the chloride contents are less than specified in sub-Clause 1.8.1.4 above; f) details of the significant rock components contained in the aggregates; g) cement content; h) additives used; and i) the sodium oxide equivalent content. <p>1.8.3.2 Containers shall be damp proof and readily emptied of their contents.</p> <p>1.8.3.3 Containers shall be marked with the following information:</p> <ul style="list-style-type: none"> a) material identification; b) batch reference number; c) formulator's name; d) net weight; and e) any warnings or precautions concerning the contents. <p>1.8.3.4 The material shall be stored in a dry environment free from extremes of cold and heat.</p> <p>1.8.3.5 Material shall not be older than three months or lesser period specified by the formulator when incorporated in the Works.</p> <p>1.8.3.6 The materials shall not be removed from the store for use in the Works until immediately prior to mixing.</p> <p>1.8.4 Trial Mixes</p> <p>1.8.4.1 Practical tests shall be carried out on the Site by constructing test panels to confirm the suitability of the mix for the Works. In these tests the type of Constructional Plant used for mixing and placing and the finished face to the panel shall be similar in all respects to those intended for use in the Works.</p> <p>1.8.5 Procedure Trials</p> <p>1.8.5.1 Before work commences on the site of the Works procedure trials shall be carried out to pre-qualify the nozzlemen proposed for use on the Works. Nozzlemen who have not been pre-qualified shall not be used.</p>

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
1775 AR (continued)	1.8.5.2 Each nozzleman shall carry out procedure trial panels. The procedure trial panels shall have minimum dimensions of 750 millimetres x 750 millimetres x 100 millimetres deep and shall be made of plywood with 45 degrees sloped edge to permit rebound to escape.
	1.8.5.3 One half of each procedure trial panel shall contain reinforcement representative of the size and spacing of the work. The second half of the procedure trial panel shall contain no reinforcement (with the exception of fibre reinforcement) to allow for the extraction of cores for testing in accordance with sub Clause 1.17.2 of this Clause.
	1.8.5.4 One procedure trial panel shall be undertaken using each proposed mixture proportion at each proposed orientation i.e. horizontal overhead and the like.
	1.8.5.5 A minimum of three 100 millimetre diameter cores shall be extracted from the location of intersecting reinforcing steel to check the adequacy of consolidation of the sprayed concrete around the reinforcement.
	1.8.5.6 No sprayed concrete shall be carried out on the Works until the procedure trial testing requirements have been met.
	1.9 Surface Preparation for Sprayed Concrete
	1.9.1 Sound surfaces which are to receive sprayed concrete shall be thoroughly cleaned and roughened by grit blasting or high pressure water jetting.
	1.9.2 All concrete surfaces to receive sprayed concrete, exposed by percussive methods using hand or mechanical tools, shall be prepared by low vibration processes, such as grit blasting or high pressure water jetting, to remove all fractured aggregate particles and expose a sound substrate. Grit blasted areas shall have sprayed concrete applied within 48 hours or shall be reblasted.
	1.9.3 Immediately prior to spray concreting all the surfaces to be sprayed shall be thoroughly cleaned and wetted with a strong blast of oil-free air and water to comply with the requirements of BS EN 1008.
	1.10 Outline Definition
	1.10.1 The outline of the finished sprayed concrete shall be defined by screed boards guide wires or other means proposed by the Contractor and consented to in writing by the Engineer.
	1.10.2 Guide wires shall be installed tight and true to line and in such a manner that they may be easily tightened.
	1.11 Mixing Sprayed Concrete
	1.11.1 Sprayed concrete shall be mixed in a batch type mixer capable of delivering water direct to the nozzle. The delivery equipment shall be capable of delivering a continuous even stream of uniformly mixed material to the nozzle. Water supply at the nozzle shall be maintained at a uniform pressure sufficient to ensure adequate hydration at all

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Clause No etc	Title and written text
1775 AR (continued)	times. The delivery equipment and nozzle shall be thoroughly cleaned and inspected at the end of each day and parts replaced as required.
	1.11.2 The temperature of water and cement when added to the mix shall not exceed 60 degrees Celsius and 65 degrees Celsius respectively.
	1.11.3 Water used in sprayed concrete shall comply with the requirements of BS EN 1008.
	1.12 Reinforcement
	1.12.1 Welded wire mesh fabric reinforcement shall be fixed to prepared surfaces and shall be carefully bent to follow the shape of the members and held in position by anchors spaced at not less than two per square metre. The fabric shall be spaced at not less than 25 millimetres from the finished surface of the concrete.
	1.13 Transport and Placing Sprayed Concrete
	1.13.1 No concrete shall be sprayed in air temperatures less than five degrees Celsius or onto a surface temperature less than five degrees Celsius. Surfaces shall be free from standing water.
	1.13.2 Sprayed concrete shall emerge from the nozzle in a steady uninterrupted flow and an uninterrupted supply of compressed air shall be provided to maintain adequate nozzle velocity. Should the flow become intermittent the nozzle shall be directed away from the work until the flow again becomes uniform.
	1.13.3 Sprayed concrete shall be applied under sufficient pressure so as to give a dense and homogeneous covering to the surface in one or more layers of a thickness compatible with the mix Design constituents' position of reinforcement and plane of application to ensure the placed concrete does not slump or sag.
	1.13.4 Adequate precautions shall be taken to ensure that sprayed concrete rebound is not incorporated in the finished work and that any previously deposited hardened rebound which may prevent a proper bond or encasement is removed from reinforcement.
	1.13.5 Adequate protection shall be given to the nozzle and application surface during high winds.
	1.13.6 The final coat shall be hand screeded to a Class U3 finish in accordance with sub-Clause 1708.4
	1.14 Fibre Reinforced Sprayed Concrete
	1.14.1 The weight of steel and / or composite fibres shall not exceed five per cent by weight of the combined weight of cement and aggregate. Fibres shall be added to the mix in such a manner that the fibres are evenly distributed and not bent. Procedure trials shall be undertaken to demonstrate that the proposed methods can achieve the requirements of this sub-Clause.

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Clause No etc	Title and written text
1775 AR (continued)	1.14.2 Unless otherwise stated elsewhere in the Contract a final 15 millimetres thick coat of unreinforced sprayed concrete shall be applied over the whole exposed surface to cover exposed fibres.
	1.14.3 The gun and nozzle shall be electrically earthed.
	1.15 Construction Joints
	1.15.1 Construction joints in sprayed concrete shall be tapered at approximately 30 degrees or cut back square to the reinforcement and then tapered at 30 degrees. The construction joint shall be thoroughly cleaned and all laitance and loose material removed and the surface wetted using a strong blast of air and water prior to the placement of adjacent sprayed concrete.
	1.16 Curing of Sprayed Concrete
	1.16.1 Freshly sprayed concrete shall be protected from rain or water until the surface is sufficiently hard to resist damage.
	1.16.2 Immediately after placing and for 14 days thereafter sprayed concrete shall be protected against harmful effects of weather including rain rapid temperature changes and frost and from drying out. Curing membranes shall not be used.
	1.16.3 Impregnation in accordance with BD 43 may be carried out after 14 days.
	1.17 Production Testing of Sprayed Concrete
	1.17.1 One production test panel shall be carried out for each nozzle orientation for each day of sprayed concrete production or every five cubic metres of sprayed concrete whichever is the lesser.
	1.17.2 Sprayed concrete production test panels shall be made with dimensions 450 millimetres x 450 millimetres x 100 millimetres thick with 45 degrees sloped edge forms to permit escape of rebound. Production test panels shall contain no reinforcement (other than fibre reinforcement). The production test panels shall be marked cured cored and tested in compression in accordance with the appropriate parts of BS EN 12350 and BS EN 12390. They shall be tested in a UKAS accredited laboratory. Records shall be maintained of all tests and stored at a suitable location.
	1.17.3 Routine tests shall be carried out by the Contractor on the finished sprayed concrete. These shall consist of taking 25 millimetres or 100 millimetres dia. cores from the finished sprayed concrete and testing them in the same manner as cores taken from the test panels or by carrying out non-destructive tests by means of a 'Schmidt' hammer or 'Windsor Probe' to determine compressive strength and testing for bond by the use of a hand hammer.
	1.18 Resin Injection Repairs
	1.18.1 Preparation of Surfaces Around Cracks

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Clause No etc	Title and written text
1775 AR (continued)	1.18.1.1 The concrete surface at least 50 millimetres either side of the crack shall be dry blast cleaned to a sound surface free from dirt moss salt staining and loose concrete. The full extent of the crack shall be found and the cleaned area shall extend 50 millimetres beyond the end of the crack or until the crack becomes too narrow to warrant resin injection.
	1.18.1.2 Where algae or other bacterial growth emanates from the crack it shall be removed by scrubbing with bactericide and rinsing with clean water. Health and safety precautions appropriate to the bactericide cleaning agent used shall be adopted including those recommended in writing by the manufacturers. Measures shall be taken to ensure that any adjacent water course is not contaminated and that run-off is collected and disposed of in a safe manner.
	1.18.2 Moisture in Cracks
	1.18.2.1 Where the moisture level in the crack to be resin injected is unacceptably high the crack shall be blown through with dry hot air starting at the top of the crack. A temporary crack sealant shall be applied immediately after blowing through and the resin shall be injected into the crack immediately the necessary preparations are complete.
	1.18.2.2 If for whatever reason the crack becomes damp before it is resin injected no further work shall be permitted until the temporary crack sealant is removed and the crack blown through again with dry hot air
	1.18.2.3 The temperature of the hot air shall be sufficient to dry the full depth of the crack and shall not exceed the maximum temperature specified by the equipment manufacturer.
	1.18.3 Resin Injection
	1.18.3.1 The resin to be used shall be either polyester or epoxy based and shall be mixed and injected in accordance with the manufacturer's written specification. Resin shall not be injected when the air temperature or the surface temperature concrete to be repaired is less than five degrees Celsius.
	1.18.3.2 The spacing of the nozzle positions shall be equal to the depth of the crack and shall not in any case be less than 250 millimetres.
	1.18.3.3 Injecting shall start at the bottom of the crack and work shall proceed upwards in a continuous operation throughout. Resin shall be seen extruding from the crack at the next nozzle position before the current nozzle location is locked off.
	1.18.3.4 The injected crack shall be left undisturbed for a period of at least 24 hours to allow the resin to harden.
	1.18.3.5 When the resins are sufficiently cured the cracks and any resin spillages shall be cleaned from the face of the concrete.
	1.18.4 Proving Tests
	1.18.4.1 When the resin has set, two 20 millimetres diameter proving cores shall be taken to the full depth of the crack. These shall be filled with either

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Clause No etc	Title and written text
<p>1775 AR (continued)</p>	<p>the resin used for injecting or with a suitable filler of a compatible thixotropic resin.</p> <p>1.19 Sealing of Cracks in Concrete Bridge Decks</p> <p>1.19.1 The preparation of surfaces around cracks and the measures to deal with algae or other growth in cracks shall be as described in sub-Clause 1.18 above.</p> <p>1.19.2 Application of Sealer</p> <p>1.19.2.1 The sealing resin shall be a low viscosity polyester epoxy or acrylic polymer which shall be compatible with any proposed waterproofing system.</p> <p>1.19.2.2 The material shall be applied by pouring through a fine nozzle directly into the crack or into pre-formed dams.</p> <p>1.19.2.3 The injected crack shall be left undisturbed for a period of at least 24 hours to allow the resin to harden.</p> <p>1.19.2.4 When the resins are sufficiently cured the cracks and resin spillages shall be cleaned to the face of the concrete.</p>
<p>1776 AR</p>	<p>1 Foamed Concrete Fill to Structures and Backfilling to Drainage Trenches</p> <p>1.1 Foamed concrete fill to arches or bridge decks shall be of density 1400 – 1600 kilograms per cubic metre. Minimum cement content shall be 350 kilograms per cubic metre. The maximum free water cement ratio shall be 0.4. The minimum compressive strength shall be eight newtons per square millimetre.</p> <p>1.2 Foamed concrete fill to drainage trenches shall comply with sub-Clause 1 above.</p>
<p>1777 AR</p>	<p>1 Installation of Resin Anchored Reinforcement</p> <p>1.1 General</p> <p>1.1.1 Installation of resin anchored reinforcement into existing reinforced concrete shall utilise proprietary products, materials and methods suitable for highway works and for the conditions set out below.</p> <p>1.1.2 The Contractor shall consult and comply with the requirements of Transport Scotland with regard to all resin anchor systems. The Contractor shall provide the Engineer with completed Consultation Certificates in accordance with Section 8 of the Employer's Requirements in respect of this requirement.</p> <p>1.1.3 The resin anchor system proposed shall be checked against the anchorage design to ensure that it is capable of resisting the design loads by means of testing. For the purposes of testing the test loading shall be the load calculated allowing for a 30 per cent increase above ULS design load and adjusted to allow group effects to be ignored.</p>

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Clause No etc	Title and written text
1777 AR (continued)	1.1.4 Site testing to verify the above loads is required and is specified in sub-Clause 1.2 below.
	1.1.5 Materials
	1.1.5.1 Resin adhesive grout for anchoring reinforcement shall be polyester or epoxy based and non-expansive. Grout shall be stable over the temperature range of –20 degrees Celsius to +40 degrees Celsius and be resistant to mechanical and chemical degradation under normal service conditions.
	1.1.6 Workmanship
	1.1.6.1 Installation shall strictly follow the methods and working procedures specified by the proprietary product manufacturer. Adequate preparations shall be made to work involving resin grouting to avoid inconsistent results.
	1.1.6.2 Locations for the drilling of holes shall be determined by the design of the Works. The design of the Works shall ensure that locations can be adjusted within tolerances specified in the design of the Works to avoid existing reinforcement. It shall be ensured that holes do not clash with existing buried reinforcement by using non-destructive test methods (e.g. cover meter) prior to commencement of drilling.
	1.1.6.3 Before and after drilling holes it shall be ensured that the existing concrete is sound, and that any significant defects such as loose fractures and voids are repaired. Any defective holes shall be repaired and not used. Alternative holes shall be re-drilled in new locations without affecting the design of the Works.
	1.1.6.4 Holes shall be formed using rotary percussion drilling. The diameter and minimum depth shall be as required by the design of the Works.
	1.1.6.5 After drilling, holes shall be free of all contaminants including dust and water before injecting grout. It shall be ensured that grout fills the hole entirely without air voids following insertion of the reinforcement, and that the reinforcement is fully coated by the grout. Excess grout shall be removed immediately.
	1.1.6.6 Reinforcement shall not be inserted or grout used after the gel time, and the completed installation shall not be disturbed until the grout is fully cured. Gel times and curing times as stated by the product manufacturer will depend on concrete temperature, therefore temperature shall be recorded during installation.
	1.2 Testing of Resin Anchored Reinforcement
	1.2.1 The adequacy of resin fixed reinforcement shall be verified by site testing. For each combination of bar size and embedment depth, 1 No. test shall be carried out for every 20 bars, subject to a minimum of 3 No. tests.
	1.2.2 A test rig equivalent to that shown in BS 5080 Part 1: 1993, Figure 3 shall be used. The test rig shall be capable of testing the anchor bars in situ.

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Clause No etc	Title and written text
1777 AR (continued)	<p>1.2.3 If, due to the shape code or spacings of the bars to be resin grouted into the deck, it is not possible to apply the test rig to a bar, the following procedure should be followed: A straight bar of the same type, diameter and embedment depth shall be tested as close to the scheduled test bar as is practical.</p> <p>1.2.4 The bars shall be capable of resisting the test loads given in sub-Clause 1.1.3 above.</p> <p>1.2.5 A force sufficient to take up any slack in the apparatus, attachment and seating should be initially applied in accordance with BS 5080 Part 1: 1993. Readings taken at this stage will constitute the base from which subsequent relative movement shall be measured.</p> <p>1.2.6 Each tested anchor shall be loaded incrementally in tension in accordance with BS 5080 Part 1: 1993 up to the test load.</p> <p>1.2.7 Incremental loads shall be held for not less than half a minute and the test load for not less than five minutes.</p> <p>1.2.8 Readings shall be taken immediately after applying load and at the ends of the time intervals stated above.</p> <p>1.2.9 There should be no movement of the anchorage during the test and total movement should be no greater than the load / extension characteristics of the reinforcement bar being tested and the testing apparatus being used.</p> <p>1.2.10 Any evidence of slip during loading up to the test load, as demonstrated by a significant change in the slope of the load / extension curve, shall constitute a failure.</p> <p>1.2.11 Testing records shall be retained at the end of each testing day.</p>
1778 AR	<p>1 Early Thermal cracking</p> <p>1.1 The Contractor shall develop suitable concrete mix designs and safe curing methods to ensure that any cracking due to early thermal effects does not exceed appropriate permissible crack widths in BS EN 1992-2 and to ensure compliance with the following criteria.</p> <p>a) Peak temperature: 65 degrees Celsius</p> <p>b) Maximum temperature differential within a single pour: in accordance with Table 7.1 of CIRIA C660 for internal restraint, $R = 0.42$, for the appropriate coarse aggregate type. If limestone coarse aggregate is to be used, the assumed value for coefficient of linear thermal expansion shall be demonstrated by measurements on concrete specimens.</p> <p>i) The demonstration shall include the results of early thermal cracking trial pours, as scheduled in Appendix 1/5 of the specification. The temperature rise recorded in the trial pours may be used to establish the temperature rise for the concrete and to enable more reliable predictions of temperature rise using CIRIA C660.</p>

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Clause No etc	Title and written text
1778 AR (continued)	<p>ii) The relationship established from the trial pours between temperature and strain change may be used to determine the coefficient of thermal expansion and contraction as the temperature in the block rises and falls. This performance data can then be used to demonstrate compliance with the Agreement requirements to restrict early thermal cracking.</p> <p>2 Early Thermal Cracking Trial Pours</p> <p>2.1 Early thermal cracking trial pours shall be performed in advance of construction for each proposed concrete mix subject to these considerations. Further testing shall be performed in advance of any changes to materials or mix composition that might have a significant effect on these properties including, but not limited to, changes in type, source or content of cement, ground granulated blastfurnace cement or fly ash.</p> <p>2.2 Insulated 'hot-blocks' (one cubic metre) shall be used to simulate the temperature conditions in large sections. The base, sides and top should be contained in 18 millimetre plywood with 50 millimetres of polystyrene insulation. The temperature in the block should be measured using thermocouples (at the centre and at the surface). 100 millimetres cores shall be taken at 28 days for testing compressive strength and checking for internal cracks.</p> <p>2.3 The test blocks should be instrumented using thermocouples and Vibrating Wire strain gauges (VWG) to provide a measure of the temperature rise and the associated strain.</p> <p>2.4 The following test data shall be recorded on the test certificate:</p> <ul style="list-style-type: none"> a) Name and address of the test laboratory; b) Date and identification number of the test report; c) Name and address of the organisation responsible for the testing; d) Name and address of the concrete supplier; e) Date of arrival of the concrete; f) Composition of the concrete tested, including sources of materials; g) Purpose of the test; h) Test method; i) Any deviation from the test method; j) Name of the person who performed the test; k) Date of the test; l) Test results, including: <ul style="list-style-type: none"> i) Compressive strength of cores taken and tested in accordance with BS EN 12504-1 and BS EN 13791 at an age of 28 days; ii) The temperature rise; and m) Date and signature.

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Clause No etc	Title and written text
1779 AR	<p>1 Retaining Wall Concrete Finish</p> <p>1.1 These requirements apply for use on exposed concrete retaining walls greater than 3m in height which are visible to road users or from properties at any distance and wherever positioned within a landscape comprising woodland, parkland, agricultural land or moorland.</p> <p>1.2 The wall shall incorporate two contrasting surface textures; an upper level texture and a lower level texture for the entire length of the wall. The upper level texture shall cover 40-50% of the wall. The lower level texture shall cover 50-60% of the wall.</p> <p>1.3 The upper level texture shall comprise a coarse, rough cast grain with 5-16mm relief depth. The use of formliners or retarders are acceptable methods of achieving a rough cast grain finish.</p> <p>1.4 The lower level texture shall comprise vertical recessed channels of concrete with a smooth finish and varying heights and spacings. The depth of the channels shall be no less than 20mm and no more than 40mm. The width of the channels shall be no less than 150mm and no more than 200mm. The centres of the channels shall be spaced apart at variable dimensions from 200mm to 300mm. Three adjacent channels shall have centres varying by at least 20mm. The concrete finish between channels shall comprise a coarse, rough cast grain with 5-16mm relief depth.</p> <p>1.5 In locations where the overall wall height becomes less than 3m the lower level texture should be applied to the full height of the wall. Where a retaining wall abuts a bridge abutment the lower level texture should be applied to the full height of the wall for a 3m minimum width from the bridge abutment and the bridge abutments shall receive a finish to match the retaining wall.</p> <p>1.6 The top and sides of each recessed channel shall incorporate a suitable chamfer to assist with the striking of the formliner/shuttering.</p> <p>1.7 The vertical channels incorporated in the lower level texture shall terminate at different heights to create the impression of a smooth but random rolling series of peaks (highest points of a wave pattern) and troughs (lowest points of a wave pattern).</p> <p>1.8 The vertical channels incorporated in the lower level texture shall terminate with a horizontal top. Adjacent channels shall have a height difference of at least 50mm.</p> <p>1.9 Adjacent wave heights or vertical distance between the trough and the peaks forming the upper outline to the lower level texture should vary by a minimum of 15%.</p> <p>1.10 The height from ground level of any trough formed by the upper outline to the lower level texture shall be no less than 500mm.</p> <p>1.11 No wavelengths (LW) or horizontal distance between the peaks forming the upper outline to the lower level texture should be less than 5000mm. Adjacent wave lengths shall vary in length by a minimum of 15%.</p>

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Clause No etc	Title and written text
1779 AR (continued)	<p>1.12 The upper outline of the lower level texture comprising vertical channels shall incorporate variable length plateaus and variable gradients from 0-35 degrees to the horizontal. A plateau is a horizontal line defined by the linear interpolation of the local high points in a series of adjacent grouped channels.</p> <p>1.13 Each peak to peak cycle profile in a series of five cycles for the lower level texture shall differ from every other peak to peak cycle profile within the five cycle series. Every wall should incorporate a minimum of three peak to peak cycles.</p>
2171 AR	<p>1. Bearing Replacement</p> <p>1.1 Bearings to new structures</p> <p>1.1.1 Bridges supported on bearings shall be designed to allow the inspection, maintenance, removal and replacement of such bearings without the need to close the bridge to normal traffic. Under such circumstances, only traffic loads due to Load Model 1 and Load Model 2 shall be considered. Other traffic loads shall not apply, i.e., Load Model 3 (Special Vehicles) and Fatigue Load Models need not be considered.</p> <p>1.1.2 Replacement of bearings by jacking shall allow for the effect of the deck being raised by 10 millimetres, or other specified value appropriate to the particular bearing in accordance with the manufacturer's requirements, to facilitate removal and replacement of bearings.</p> <p>1.1.3 Jacking points shall be designed to accommodate the jacking loads including any fixed / sliding articulation requirements to ensure the overall stability of the structure during bearing replacement operations.</p> <p>1.1.4 The effects due to jacking of a Structure for bearing replacement shall be considered in combination with permanent and variable actions as follows:</p> <ul style="list-style-type: none"> a) ultimate limit state: application of Equation 6.10 of BS EN 1990+A1; and; b) serviceability limit state: as a frequent load combination as defined in Clause 6.5 of BS EN 1990+A1. <p>1.1.5 The location of temporary jacking points and any restrictions on the positioning of jacks, e.g. in relation to jacking stiffeners in steel web plates, and safe working loads assumed in the design of the temporary jacking system shall be clearly identified on the drawings.</p> <p>1.2 Bearings to existing structures</p> <p>1.2.1 The design of replacement bearings shall allow the inspection, maintenance, removal and replacement of such replacement bearings without the need to close the bridge to normal traffic.</p> <p>1.2.2 Replacement of bearings to be undertaken by jacking shall allow for the effect of the deck being raised by 10 millimetres, or other value appropriate to the particular existing and replacement bearings in</p>

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Clause No etc	Title and written text
2171 AR (continued)	<p>accordance with the manufacturer's requirements, to facilitate removal and replacement of the bearings.</p> <p>1.2.3 The deck shall be jacked from suitable jacking points which shall accommodate the jacking loads including any fixed / sliding articulation requirements to ensure the overall stability of the structure during bearing replacement operations. Where necessary, the existing deck shall be modified and/or strengthened to accommodate the jacking points to be used in the replacement of the bearings.</p> <p>1.2.4 Replacement bearings shall be designed for the load effects due to Load Models LM1, LM2 and LM3 (Special Vehicles).</p> <p>1.2.5 The location of temporary jacking points and any restrictions on the positioning of jacks, e.g. in relation to jacking stiffeners in steel web plates, and safe working loads assumed in the design of the temporary jacking system shall be clearly identified on the drawings.</p>
3000 AR	Landscape Operations - Planting and Landscape Maintenance
3001 AR	<p>General Conditions</p> <p>(i) All landscape preparation, planting and seeding work shall be completed at the earliest practical opportunity to ensure early establishment.</p> <p>(ii) Landscape Maintenance</p> <p>a) Landscape Maintenance shall cover a period of 260 weeks from the issue of the Certificate of Completion.</p> <p>(iii) Special Requirements</p> <p>a) The Contractor shall comply with the requirements of Environmental Criteria given in Section 4.4 of the Employers Requirement's and any other requirements detailed in the Contract Documents.</p> <p>b) The Contractor shall make due allowance for undertaking landscape operations whilst the roads are in use.</p> <p>(iv) Temporary Site Nursery and Accommodation</p> <p>a) The Contractor shall make all arrangements for the delivery or use of tempor</p> <p>b) ary or permanent buildings as required, in order to establish a temporary site nursery and to carry out the landscape Works, with the prior acknowledgement of the Overseeing Organisation.</p> <p>(v) Standard of Work</p> <p>a) All Works shall be carried out according to the recommendations of BS 4428: 1989 'General Landscape Operations'.</p> <p>(vi) Cleansing of Site Area</p> <p>From the date of entry to the Land Made Available by the Employer for the Works until the end of the Period of Establishment Maintenance, the</p>

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Clause No etc	Title and written text
<p>3001 AR (continued)</p>	<p>Contractor shall be responsible for the removal of all types of litter, debris and rubbish from the Site as follows:</p> <ul style="list-style-type: none"> a) provision shall be made for removing all arisings and waste resulting from the Works at the end of each day's work, and on completion, the Site shall be left in a clean and tidy condition; b) all paved and hard areas shall be kept clean and free from contamination with soil, arisings, plants and planting materials which shall be cleared after each day's work; c) provision shall be made for the reinstatement of all tracks, grass and agricultural areas used for access as part of the Works. <p>(vii) Protection of Drains</p> <p>Notwithstanding the other provisions of this Contract precautions shall be taken during all planting operations to ensure that drainage systems shall not be damaged, contaminated with soil and the like.</p>
<p>3003 AR</p>	<p>Delivery of Plants</p> <p>1. Deliveries of plant material shall be co-ordinated with planting operations to ensure that no plants are left unplanted for excessive periods and that the Works proceed in accordance with the Clause 14 Programme. Any stock arriving on Site which is defective or below the other provisions of the Contract shall not be permitted in the Works. The Contractor shall ensure that plant material shall be stored as follows:</p> <ul style="list-style-type: none"> (i) All bare rooted plants shall have their root systems immersed in an alginate root dip immediately on receipt from the supplier and prior to planting. Bare-rooted plants shall be heeled in moist friable soil, or supported upright on a well-drained area and the roots immersed in a deep layer of moist straw, compost, pulverised bark, or other suitable material. The material shall be firmed to exclude air (particularly on the inside of bundles) and watered periodically as the condition of the material requires. Watering shall not be carried out in freezing conditions and polythene wrappings shall be removed prior to the plants being heeled in. (ii) Container-grown plants shall be maintained upright on a well-drained area and protected from direct sunlight. The containers/pots shall be covered with a layer of peat and watered as required. Watering and spraying shall not be carried out in freezing conditions. (iii) Rootballed plants with permeable wrappings shall be kept moist by watering and polythene wrappings shall be protected from direct sunlight. For longer periods of storage, rootballs with permeable wrapping shall be placed on a well-drained surface and covered with a deep layer of moist straw, compost, pulverised bark, or other suitable material. (iv) All polythene wrappings shall be non-transparent and shall be protected from direct sunlight at all times. Where delays of more than a few days occur, the bags shall be stored upright, in a cool shady

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Clause No etc	Title and written text
	position with the plants root systems covered with a deep layer of moist straw, compost, pulverised bark, or other suitable material.
3004 AR	<p>1 Wildlife Pond Design</p> <p>1.1 The wildlife pond shall be designed and constructed to incorporate the following:</p> <ul style="list-style-type: none"> (i) A waterproof lining of butyl rubber membrane or bentonite sulphate installed in accordance with the manufacturer's recommendations; (ii) A water surface area of not less than 400m² when full; (iii) An area of open water measuring not less than 7m wide and 10m long; (iv) Submerged terraces of varying width around the margins at a range of depths between 300mm and 50mm below high water, spread with at least 150mm depth nutrient poor topsoil or subsoil to cover the pond liner and provide a substrate for planting of emergent and marginal plant species. The submerged terraces shall occupy approximately 50% of the overall pond area and vary in width from 0.5m to 2.5 metres; (v) A 'wetland' marginal zone at least 1m wide around not less than 50% of the pond's perimeter, contained within the waterproof pond lining, spread with at least 150mm depth nutrient poor topsoil or subsoil with a finished level at or slightly above final water level suitable for planting of native species marginal plants; (vi) An area of 600mm to 1000mm depth below high water level occupying not less than 30% of the total pond area; and (vii) Shallow sloping sides to allow wildlife easy access.

APPENDIX 0/1: CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

PART B: VOLUME 2 NOTES FOR GUIDANCE ON THE SPECIFICATION FOR HIGHWAY WORKS**LIST OF ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES TABLES AND FIGURES**

Clause No etc	Title
None	

APPENDIX 0/2: CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT
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PART A: VOLUME 1 SPECIFICATION**LIST OF MINOR ALTERATIONS TO EXISTING CLAUSES**

Clause No etc	Alteration to be made
121	Tidal, Flowing and Standing Water
201	Clearing
606	Watercourses
618	Topsoiling, Grass Seeding and Turfing
901	Bituminous Pavement Mixtures
920	Bond Coats, Track Coats and Other Bituminous Sprays
930	EME2 Base and Binder Course Asphalt Concrete
1309	Amendments and additions to BS 5649 : Part 2 : 1978 (AMD 3136,1979)
1714	Reinforcement – Fixing
Table 19/3B	Requirements for Steel in Bridge Bearings (and Metal Coated Fasteners) Protective System Type V
2001	General
2006	Workmanship for Waterproofing Below Ground Concrete Surfaces
2007	Integrity Testing of Concrete Bridge Deck Waterproofing

APPENDIX 0/2: CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

MINOR ALTERATIONS TO EXISTING CLAUSES

Clause No etc	Alteration to be made
121	<p>Tidal, Flowing and Standing Water</p> <p><i>Add at the end of Clause:</i></p> <p>Notwithstanding any other provisions of the Contract, the Contractor shall take adequate precautions to prevent the damage and pollution of streams, waterways and water courses and shall indemnify the Employer against all claims arising from any such pollution caused by virtue of the operation during the currency of the Contract. The Contractor shall make good any unnecessary damage to streams, waterways and watercourse at his own expense.</p>
201	<p>Clearing</p> <p><i>Delete sub-Clause 3 and insert new sub-Clause 3:</i></p> <p>Disused chambers located under the road pavement or verge shall be demolished to a depth of 0.5 metres below formation, properly cleaned out, and filled or capped to meet the requirements of the Relevant Roads Authority. To permit free drainage holes of 76mm diameter (minimum) shall be made at 500mm centres over the whole areas of slabs basements etc, which are not removed and which are liable to hold water.</p>
606	<p>Watercourses</p> <p><i>Add to sub-Clause 2</i></p> <p>With the exception of gravels, water worn pebbles and boulders from areas of redundant watercourses which may be excavated and set aside for reuse.</p>
618	<p>Topsoiling, Grass Seeding and Turfing</p> <p><i>Delete sub-clause 2 and insert</i></p> <p>Class 5B imported topsoil shall only be used when permitted in writing by the Employer and shall be tested for major nutrient requirements in accordance with Appendix 1/5.</p>
901	<p>Bituminous Pavement Mixtures</p> <p><i>Paragraphs 1 to 18 as per the Specification for Highway Works</i></p> <p><i>Add the following sub clause after sub-clause 18:</i></p> <p>19 Asphalt Durability</p> <p>In accordance with SEDD Interim Amendment No. 12 – Bituminous pavement courses shall be made using the materials described in Appendix 7/1 and shall be in compliance with the sector Scheme Document for the laying of Asphalt Mixes described in Appendix A.</p> <p>Appendix A Quality Management Scheme 14</p> <p><i>Insert Note 2 as follows:</i></p> <p>“Note 2 in addition to the list of British Standards, the TRL Project Report 65 is to be included for use in the production of the Stone Mastic Asphalt (SMA) mix design for the Works”</p>

APPENDIX 0/2: CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

920	<p>Bond Coats, Tack Coats and other Bituminous Sprays</p> <p><i>Sub-Clause 1</i></p> <p>Delete last sentence and replace with: “In the event that no British Board of Agrément HAPAS Certificates have been issued in respect of any proprietary bond coats, tack coats or other bituminous sprays that comply with Sub-clauses 2 to 12 of this Clause and the requirements specified in Appendix 7/4, detailed proposals accompanied by the contractors Quality Plans and method statements appropriate to the Design, Construction, Completion and maintenance of the Works may be submitted to the Overseeing Organisation for approval on a project specific basis.”</p>
930	<p>EME2 Base and Binder Course Asphalt Concrete</p> <p>Paragraphs 1 – 20 as per the Specification for Highway Works</p> <p>Add the following sub-clauses after sub-clause 20:</p> <p>Job Mixture Verification Trial</p> <p>21 General</p> <p>For each mixture, a job mixture verification trial shall be carried out to verify the properties of the mixture and the effectiveness of the compaction plant and rolling procedures. The trial area shall be not less than 30m long and shall be of appropriate width for the laying and rolling procedures being demonstrated. Mixing, laying and compaction plant and procedures shall be as close as possible to those to be encountered on the full scale works.</p> <p>22 Mix analysis</p> <p>During the laying of the trial area, samples of loose mixture shall be taken at three evenly spaced locations along the trial length, in accordance with BS EN 12697-27. These shall be analysed for soluble binder content and grading to demonstrate conformity with the target composition as described in Table B.8 of PD 6691+A1.</p> <p>23 Maximum Density</p> <p>At each of the locations described in Clause 22, a further loose mix sample shall be taken for maximum density determination. The maximum density of each sample shall be determined in accordance with BS EN 12697-5. The average value of maximum density r_{max} expressed in Mg/m³ shall then be used for subsequent calculation of the air void content of the compacted mixture.</p> <p>24 Bulk Density and Void Content</p> <p>At three locations, pairs of 150mm diameter cores shall be taken in accordance with BS EN 12697-27, six cores in total. Two of the cores shall be in the wheel track zones (between 0.5m and 1.1m and between 2.55m and 3.15m from the nearside lane marking) of the completed lane or mat, the third shall be selected as appropriate. The bulk density ρ of each core shall be determined in accordance with BS EN 12697-6 Procedure A. Void contents shall be calculated to $\pm 0.1\%$ as follows:</p> <ul style="list-style-type: none"> • Air voids content = $(1 - \rho/\rho_{max}) \times 100\%$ • The average value of the six air void contents shall be in accordance with Clause 930.15.

APPENDIX 0/2: CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

<p>930 (continued)</p>	<p>25 Dynamic Stiffness</p> <p>The six cores taken under Clause 24 shall be used for the preparation of specimens for testing of Indirect Tensile Stiffness Modulus in accordance with BS EN 12697-26. The mean result shall be used to determine conformity with Clause 26.</p> <p>26 The mean Indirect Tensile Stiffness Modulus of the six 150mm diameter cored specimens shall not be less than 4.5 GPa.</p> <p>27 Calibration of Nuclear Gauge</p> <p>If a nuclear gauge or other indirect device is to be used to monitor and control compaction during the main works, it may be convenient to use the core results of the job mix verification trial to calibrate against core density.</p> <p>28 Resistance to Permanent Deformation</p> <p>Within the trial area resistance to permanent deformation shall be tested in accordance with Paragraph B.3.3.5 of PD 6691. The limiting wheel tracking requirement shall be Category 1, i.e. "Moderate to heavily stressed sites requiring high rut resistance".</p> <p>Resistance to permanent deformation shall be monitored in the main works in accordance with Paragraphs D.3.1, D3.2 and D.3.3 of BS 594987 Annex D, one core shall be tested per lane kilometre, at locations to be agreed with the Overseeing Organisation. Results shall be assessed on successive rolling means of sets of six consecutive results and shall be deemed to conform if the mean is no greater than the specified value and individual values not more than 50% greater than the specified value.</p>
<p>1309</p>	<p>Amendments and additions to BS 5649 : Part 2 : 1978 (AMD 3136,1979)</p> <p><i>Page 4 Clause 3</i></p> <p>Delete references to 3 degrees, 15 degrees 1.5 metres and 2.5 metres</p> <p><i>Add</i></p> <p>'In the table delete bracket projections w of 1.25 metres, 2 metres and 3 metres'</p>
<p>1714</p>	<p>Reinforcement – Fixing</p> <p><i>Add sub Clause 2:</i></p> <p>The cover survey shall be carried out by the use of an electronic covermeter with a facility for downloading to a computer. The results of the cover survey shall be downloaded to a computer and passed to the Engineer within 24 hours and the results shall also be included in the Bridge Maintenance Manual.</p>

APPENDIX 0/2: CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

Table 19/3B	Requirements for Steel in Bridge Bearings (and Metal Coated Fasteners) Protective System Type V							
	Replace Areas A, B, C, D and F with:							
	Applied over		Metal Coating	1st Coat	2nd Coat	3rd Coat	4th Coat	Minimum total dry film thickness of the paint system (microns)
	Area A and D	Item No		109	112	112	168	350
		Min dry film thickness per coat (µm)		50	125	125	50	
	Area B	Item No		112				150
		Min dry film thickness per coat (µm)		150				
Area C	Item No		109	112	112	168	350	
	Min dry film thickness per coat (µm)		50	125	125	50		
Area F	Item No	Hot dip galvanize	Adhesion promoter (see Notes)	110	112 or 121	167, 168, 169 or 185	275 (325 if Item 185 finish is specified)	
	Min dry film thickness per coat (µm)			25	125	50 or 100*		
2001	<p>General</p> <p><i>Add at the end of sub Clause 1:</i></p> <p>Surfaces to receive bridge deck waterproofing shall be prepared as recommended in writing by the particular manufacturer and, in addition, shall be given a light grit blast to produce an open texture surface free from laitance and other deleterious materials.</p>							
2006	Workmanship for Waterproofing Below Ground Concrete Surfaces							

APPENDIX 0/2: CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

<p>2006 (Continued)</p>	<p><i>Add at the end of sub-Clause 3:</i></p> <p>The waterproofing shall be applied strictly in accordance with the manufacturers written instructions at the recommended rate of application.</p> <p><i>Add at the end of sub-Clause 4:</i></p> <p>Details of the proprietary system shall be submitted for the consent of the Overseeing Organisation prior to the inclusion in the Works.</p>
<p>2007</p>	<p>Integrity Testing of Concrete Bridge Deck Waterproofing</p> <p>Testing of Waterproofing Membrane</p> <p><i>Add at the end of Clause</i></p> <ol style="list-style-type: none"> 2 The Contractor shall provide with all batches of material delivered to Site a Certificate of Compliance with the Specification and Annex A. 3 The Contractor shall provide two free film samples, sprayed on to open moulds (at least 200 millimetres x 200 millimetres in area and minimum thickness 2 millimetres), for tensile strength, elongation at break to BS ISO 37 and tear strength to BS ISO 34-1, Method C. The Contractor shall supply the Overseeing Organisation with copies of the test results with the samples. 4 A membrane can be applied to the surface of concrete slabs between 14 to 17 days after casting provided no water was added to the surface of the concrete during cure. 5 The Contractor shall continuously monitor the coverage rate of the material applied to the deck and shall provide the Overseeing Organisation with sheets on a daily basis showing the start/finish weights and area covered for each period of spray operation. 6 The Contractor shall continuously monitor the wet film thickness using a gauge pin or a standard comb type thickness gauge. The Contractor shall provide the Overseeing Organisation with sheets on a daily basis indicating the wet film thickness measured and location. 7 The Contractor shall measure the adhesion of the fully cured membrane to the deck using Elcometer Adhesion Tester Model 106 or similar. Three tests will be required per 500 square metres of sprayed membrane. The Contractor shall provide the Overseeing Organisation with the test values and location of test before these areas are covered. The Contractor shall reinstate the test areas including primer if necessary. Test values below 0.7N/square millimetre shall require spraying operations to be suspended while further investigation is undertaken. Areas deemed not to meet this figure will require to be removed and resprayed at the Contractor's expense.

APPENDIX 0/2: CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

<p>2007 (Continued)</p>	<p>8 The finished waterproof membrane surface shall be “Holiday Tested” or tested by an equivalent method approved in writing by the Overseeing Organisation and any imperfections detected shall be rectified by the Contractor at his own expense. The Contractor shall make allowance in his programme of Works for such testing.</p> <p>High Voltage Pinhole/Holiday Detection for Bridge Deck Membranes Equipment</p> <p>9 Pinhole detection shall be carried out using suitable equipment and the results made available to the Overseeing Organisation. The equipment shall have the following facilities.</p> <ul style="list-style-type: none"> a) Variable DC test voltage (1-20 kilovolts DC); b) Audible and visual alarm signals; c) Sensitivity adjustment; d) Phosphor Bronze or Silicon Rubber electrode; and e) Earth lead connection with clip. <p>Test Voltage</p> <p>10 The output voltage of the Pinhole Detector shall be adjusted in accordance with the following table.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">COATING THICKNESS</th> <th style="text-align: right;">TEST VOLTAGE</th> </tr> </thead> <tbody> <tr> <td>2 millimetres to 2.5 millimetres</td> <td style="text-align: right;">12.5 kilovolts</td> </tr> <tr> <td>2.5 millimetres to 3 millimetres</td> <td style="text-align: right;">13.5 kilovolts</td> </tr> </tbody> </table> <p>The coating thickness is the maximum expected not the average.</p> <p>Procedure</p> <p>11 Identify a Site on the Bridge Deck to which the Earth lead connection from the Pinhole Detector can be fixed, i.e. a metal object imbedded in the Bridge Deck.</p> <p>Connect the leads from the Pinhole Detector in accordance with the manufacturer’s written instructions.</p> <p>Fix the Earth lead from the Pinhole Detector to the substrate and ensure that a good electrical contact is made.</p> <p>Adjust the Pinhole Detector to the required test voltage in accordance with subclause 11 of this clause.</p> <p>With the Pinhole Detector turned OFF, connect any extension rods that may be required to the test probe handle. Connect the electrode to the end of the extension rods if fitted. A damaged electrode that does not make 100 per cent contact along its length shall not be used.</p> <p>To check the Pinhole Detector is working correctly, touch the electrode onto the exposed substrate. The Pinhole Detectors alarm signal should be activated. If not, check the lead connections to the equipment and the Earth lead to the substrate, also it may be necessary to adjust the Sensitivity Control on the equipment.</p> <p>Pass the electrode over the coated surface at a maximum rate of 100 millimetres/second, paying particular attention to edges, holes and</p>	COATING THICKNESS	TEST VOLTAGE	2 millimetres to 2.5 millimetres	12.5 kilovolts	2.5 millimetres to 3 millimetres	13.5 kilovolts
COATING THICKNESS	TEST VOLTAGE						
2 millimetres to 2.5 millimetres	12.5 kilovolts						
2.5 millimetres to 3 millimetres	13.5 kilovolts						

APPENDIX 0/2: CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (Continued)

	<p>visible irregularities in the coating. The test voltage will have to be reduced if testing edges as the coating will be thin.</p> <p>When a fault has been identified by the detector, the electrode shall be moved sideways in order to identify its precise location. Subsequently the fault should be ringed with a suitable marker. Such markings shall be made sufficiently distant from the coating defect to allow the repair procedure to be carried out without detriment to the adhesion of the repair material.</p> <p>Continue testing and marking defects until all the coating has been tested, changing the electrode size as necessary.</p> <p>All repaired areas shall be re-tested.</p>
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PART B: VOLUME 2 NOTES FOR GUIDANCE ON THE SPECIFICATION FOR HIGHWAY WORKS

LIST OF MINOR ALTERATIONS TO EXISTING CLAUSES

Clause No etc	Alteration to be made
NONE	

APPENDIX 0/3: LIST OF CONTRACT-SPECIFIC NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT

Appendix 0/3 is comprised of two lists, A and B, of Numbered Appendices as follows:-

List 'A': This is a complete list of the Numbered Appendices referred to in the Specification for Highway Works with those not adopted marked 'Not Used'.

List 'B': This is a complete list of contract- specific Numbered Appendices devised for the Contract.

Guide to types of Numbered Appendices - who compiles/completes

Symbol

- | | |
|---------|--|
| (Co) | Compiler compiles: Identified in the Notes for Guidance examples by the term 'Sample' included in their title. |
| (Co)(C) | Compiler partially compiles and Contractor completes and returns to Overseeing Organisation. |
| (Co)(T) | Compiler partially compiles and Tenderer completes and returns with Tender. |
| (C) | Contractor completes and returns to Overseeing Organisation. |
| (P) | This indicates the Appendix is a national pro forma and format must not be altered. |
| (T) | Tenderer completes and returns with Tender. |

APPENDIX 0/3: LIST OF CONTRACT-SPECIFIC NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (Continued)

LIST 'A': List of Numbered Appendices Referred to in the Specification for Highway Works

Volume Number	Completed by	Appendix Number	Title
			INTRODUCTION
	(Co)	0/1	Contract-specific Additional, Substitute and Cancelled Clauses, Tables and Figures Included in the Contract
	(Co)	0/2	Contract-specific Minor Alterations to Existing Clauses, Tables and Figures Included in the Contract
	(Co)	0/3	List of contract-specific Numbered Appendices Referred to in the Specification and Included in the Contract
	(Co)	0/4	List of Drawings Included in the Contract
	(Co)	0/5	Special National Alterations of the Overseeing Organisation of Scotland/Wales/Northern Ireland
			PRELIMINARIES
	(Co)	1/1	Temporary Accommodation and Equipment for the Overseeing Organisation
	(Co)	1/2	Vehicles for the Overseeing Organisation
	(Co)	1/3	Radio Communication System for the Overseeing Organisation
	(C)	1/4	Working and Fabrication Drawings
	(Co)(C)	1/5	Testing to be Carried out by the Contractor
	(Co)	1/6	Supply and Delivery of Samples to the Overseeing Organisation
	(Co)	1/7	Site Extent and Limitations on Use
	(Co)	1/8	Operatives for the Overseeing Organisation
	(Co)	1/9	Control of Noise and Vibration
	(Co)	1/10	Permanent Works to be Designed by the Contractor
	(Co)	1/11	Temporary Works Design
	(Co)	1/12	Setting Out and Existing Ground Levels
	(Co)(C)	1/13	Programme of Works
	(Co)	1/14	Payment Applications
	(Co)	1/15	Accommodation Works
	(Co)(T)	1/16	Privately and Publicly Owned Services and Supplies
	(Co)	1/17	Traffic Safety and Management
	(Co)	1/18	Temporary Highways for Traffic
	(Co)	1/19	Routeing of Vehicles
	Not Used	1/20	Recovery Vehicles and Operation for Breakdowns
	(Co)	1/21	Information Boards
	(Co)	1/22	Progress Photographs
	(C)	1/23	Risks to Health and Safety
	(Co)(C)	1/24	Quality Management System
	Not Used	1/25	Temporary Closed Circuit Television (CCTV) System for the Monitoring of Traffic

APPENDIX 0/3: LIST OF CONTRACT-SPECIFIC NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (Continued)

LIST 'A': List of Numbered Appendices Referred to in the Specification for Highway Works (Continued)

Volume Number	Completed by	Appendix Number	Title
	Not Used	1/27	Temporary Automatic Speed Camera System for the Enforcement of Mandatory Speed Limits at Road Works (TASCAR)
	(Co)(C)	2/1	SITE CLEARANCE List of Buildings, etc. to be Demolished or Partially Demolished
	(C)	2/2	Filling of Trenches and Pipes
	(C)	2/3	Retention of Material Arising from Site Clearance
	(Co)(C)	2/4	Explosives and Blasting
	(Co)(C)	2/5	Hazardous Materials
	(Co)(C)	3/1	FENCING AND ENVIRONMENTAL BARRIERS Fencing, Gates and Stiles
	(Co)	4/1	ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN) Road Restraint Systems (Vehicle and Pedestrian)
	(Co)(C)	4/2	Information Required to Demonstrate Compliance of Road Restraint Systems to BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4: 2002
	(C)	5/1	DRAINAGE AND SERVICE DUCTS Drainage Requirements
	(C)	5/2	Service Duct Requirements
	(C)	5/3	Surface Water Channels and Drainage Channel Blocks
	(C)	5/4	Fin Drains and Narrow Filter Drains
	(C)	5/5	Combined Drainage and Kerb Systems
	(C)	5/6	Linear Drainage Channel Systems
	(C)	5/7	Thermoplastics Structural Wall Pipes and Fittings
	(C)	6/1	EARTHWORKS Requirements for Acceptability and Testing etc. of Earthworks Materials
	(C)	6/2	Requirements for Dealing with Class U1B and Class U2 Unacceptable Materials
	(C)	6/3	Requirements for Excavation, Deposition, Compaction (other than Dynamic Compaction)
	(C)	6/4	Requirements for Class 3 Material
	(C)	6/5	Geotextiles Used to Separate Earthworks Materials
	(C)	6/6	Fill to Structures and Fill Above Structural Foundations
	(C)	6/7	Sub-formation and Capping and Preparation and Surface Treatment of Formation
	(C)	6/8	Topsoiling

APPENDIX 0/3: LIST OF CONTRACT-SPECIFIC NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (Continued)

LIST 'A': List of Numbered Appendices Referred to in the Specification for Highway Works (Continued)

Volume Number	Completed by	Appendix Number	Title
	(C)	6/9	Earthworks Environmental Bunds, Landscape Areas, Strengthened Embankments
	(C)	6/10	Ground Anchorages, Crib Walling and Gabions
	(C)	6/11	Swallow Holes and Other Naturally Occurring Cavities and Disused Mine Workings
	(Co)(C)	6/12	Instrumentation And Monitoring
	(C)	6/13	Ground Improvement
	(C)	6/14	Limiting Values for Pollution of Controlled Waters
	(C)	6/15	Limiting Values for Harm to Human Health and the Environment
			ROAD PAVEMENTS - GENERAL
	(T)(C)	7/1	Permitted Pavement Options (Schedules 1, 2, 3, 4 and 5)
	(C)	7/2	Excavation, Trimming and Reinstatement of Existing Surfaces
	(C)	7/3	Surface Dressing (Sheets 1, 2 and 3)
	(C)(P)	7/4	Bond Coats, Tack Coats and Other Bituminous Sprays (Sheets 1, 2 and Binder Data Sheet)
	(C)(P)	7/5	In-Situ Recycling - The Remix and Repave Processes
	(C)(P)	7/6	Breaking Up or Perforation of Existing Pavement
	(C)(P)	7/7	Slurry Surfacing Incorporating Microsurfacing (Sheets 1,2 and 3)
	Not Used	7/8	Not Used
	(C)	7/9	Cold-Milling (Planing) of Bituminous Bound Flexible Pavement
	Not Used	7/10	Not Used
	Not Used	7/11	Overband and Inlaid Crack Sealing Systems
	Not Used	7/12	Arrester Beds
	Not Used	7/13	Saw-Cut, Crack and Seal Bituminous Overlays on Existing Joined Concrete Pavements
	Not Used	7/14	Preparation of Jointed Concrete Pavements Prior to Overlaying and Saw-Cut and Seal of Bituminous Overlay
	Not Used	7/15	Saw-Cut and Seat Existing Jointed Reinforced Concrete Pavements
	Not Used	7/16	Cracking and Seating of Existing Jointed Unreinforced Concrete Pavements and CBM Bases
	Not Used	7/17	Cracking Plant and Equipment Progress Record
	Not Used	7/18	Site Specific Details and Requirements for Cold Recycled Bitumen Bound Material
	Not Used	7/19	Site Specific Details and Requirements for Recycled Cement Bound Material

APPENDIX 0/3: LIST OF CONTRACT-SPECIFIC NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (Continued)

LIST 'A': List of Numbered Appendices Referred to in the Specification for Highway Works (Continued)

Volume Number	Completed by	Appendix Number	Title
	Not Used	7/20	Not Used
	Not Used	7/21	Surface Dressing – Recipe Specification (Sheets 1, 2 and Binder Data Sheet)
	Not Used	7/22	Repair to Potholes
			ROAD PAVEMENTS – CONCRETE AND CEMENT BOUND MATERIALS
	Not Used	10/1	Plant and Equipment for the Construction of Exposed Aggregate Concrete Surface
			KERBS, FOOTWAYS AND PAVED AREAS
	(C)	11/1	Kerbs, Footways and Paved Areas
	(C)	11/2	Access Steps
			TRAFFIC SIGNS
	(C)	12/1	Traffic Signs: General
	(C)	12/2	Traffic Signs: Marker Posts
	(C)	12/3	Traffic Signs: Road Markings and Studs
	(C)	12/4	Traffic Signs: Cones, Cylinders, FTDs and Other Traffic Delineators
	(C)	12/5	Traffic Signs: Traffic Signals
	Not Used	12/6	Traffic Signs: Special Sign Requirements on Gantries
			ROAD LIGHTING COLUMNS AND BRACKETS
	Not Used	13/1	Information to be Provided When Specifying Lighting Columns and Brackets
	Not Used	13/2	(Specification for Highway Works) Typical Lighting Column and Bracket Data Sheets 1 and 2
	Not Used	13/3	Instructions for Completion of Lighting Column and Bracket Data Sheets
	Not Used	13/4	Information to be Provided When Specifying CCTV Masts
	Not Used	13/5	(Specification for Highway Works) Typical CCTV Mast Data Sheet
	Not Used	13/6	Instructions for Completion of CCTV Mast Sheets
	Not Used	13/7	Information to be Provided When Specifying Cantilever Masts
	Not Used	13/8	(Specification for Highway Works) Typical Cantilever Masts Data Sheets 1 and 2
	Not Used	13/9	Instructions for Completion of Cantilever Masts Data Sheets
			ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS
	Not Used	14/1	Site Records

APPENDIX 0/3: LIST OF CONTRACT-SPECIFIC NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (Continued)

LIST 'A': List of Numbered Appendices Referred to in the Specification for Highway Works (Continued)

Volume Number	Completed by	Appendix Number	Title
	Not Used	14/2	Location of Lighting Units and Feeder Pillars
	Not Used	14/3	Temporary Lighting
	Not Used	14/4	Electrical Equipment for Road Lighting
	(C)	14/5	Electrical Equipment for Traffic Signs
			MOTORWAY COMMUNICATIONS
	(Co)	15/1	Motorway Communications
	Not Used	15/2	Cable Duct Requirements
			PILING AND EMBEDDED RETAINING WALLS
	(C)	16/1	General Requirements for Piling and Embedded Retaining Walls
	(C)	16/2	Precast Reinforced and Pre-stressed Concrete Piles and Precast Reinforced Concrete Segmental Piles
	(C)	16/3	Bored Cast-in Place Piles
	(C)	16/4	Bored Piles Constructed using Continuous Flight Augers and Concrete or Grout Injection
	(C)	16/5	Driven Cast-in-Place Piles
	(C)	16/6	Steel Bearing Piles
	(C)	16/7	Reduction of Friction on Piles
	(C)	16/8	Non-Destructive Methods for Testing Piles
	(C)	16/9	Static Load Testing of Piles
	(C)	16/10	Diaphragm Walls
	(C)	16/11	Hard/Hard Secant Pile Walls
	(C)	16/12	Hard/Soft Secant Pile Walls
	(C)	16/13	Contiguous Bored Pile Walls
	(C)	16/14	King Post Walls
	(C)	16/15	Steel Sheet Piles
	(C)	16/16	Integrity Testing of Wall Elements
	(C)	16/17	Instrumentation for Piles and Embedded Walls
	(C)	16/18	Support Fluid
			STRUCTURAL CONCRETE
	(C)	17/1	Schedule for the Specification of Designed Concrete
	(C)	17/2	Not Used
	(C)	17/3	Concrete - Surface Finishes
	(C)	17/4	Concrete – General
	(C)	17/5	Buried Concrete
	(C)	17/6	Grouting and Duct Systems for Post-tensioned Tendons
	(C)	17/7	Precast Concrete Products

APPENDIX 0/3: LIST OF CONTRACT-SPECIFIC NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (Continued)

LIST 'A': List of Numbered Appendices Referred to in the Specification for Highway Works (Continued)

Volume Number	Completed by	Appendix Number	Title
	(C)	18/1	STRUCTURAL STEELWORK Requirements for Structural Steelwork
	(C)(P)	19/1	PROTECTION OF STEELWORK AGAINST CORROSION (Specification for Highway Works) Form HA/P1 (New Works) Paint System Sheet
	(C)(P)	19/2	Requirements for Other Work
	(C)(P)	19/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
	(C)(P)	19/4	Form SEDD/P3 (Works) Paint Sample Despatch List, Sheets 1 and 2
	Not Used	19/5	General Requirements
	(C)	20/1	WATERPROOFING FOR STRUCTURES Waterproofing For Concrete Structures
	(C)	21/1	BRIDGE BEARINGS Bridge Bearing Schedule
	Not Used	22/1	Not Used
	(C)	23/1	BRIDGE EXPANSION JOINTS AND SEALING OF GAPS Bridge Deck Expansion Joints Schedule
	(C)	23/2	Sealing of Gaps Schedule (Other than in Bridge Deck Expansion Joints)
	(C)	24/1	BRICKWORK, BLOCKWORK AND STONEMWORK Brickwork, Blockwork and Stonework
	Not Used	25/1	SPECIAL STRUCTURES Requirements for Corrugated Steel Buried Structures
	Not Used	25/2	Requirements for Reinforced Earth and Anchored Earth Structures
	Not Used	25/3	Requirements for Pocket - Type and Grouted - Cavity Reinforced Brickwork Retaining Wall Structures
	Not Used	25/4	Environmental Barriers
	Not Used	25/5	Requirements for Buried Rigid Pipes for Drainage Structures
	(C)	26/1	MISCELLANEOUS Ancillary Concrete
	(C)	26/2	Bedding Mortar
	(C)	26/3	Cored Thermoplastic Node Markers

APPENDIX 0/3: LIST OF CONTRACT-SPECIFIC NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (Continued)

LIST 'A': List of Numbered Appendices Referred to in the Specification for Highway Works (Continued)

Volume Number	Completed by	Appendix Number	Title
			LANDSCAPE AND ECOLOGY
	(Co)(C)(P)	30/1	General, sheets 1, 2 and 3
	(Co)	30/2	Weed Control
	(Co)	30/3	Control of Rabbits and Deer
	(Co)	30/4	Ground Preparation
	(Co)	30/5	Grass Seeding, Wildflower Seeding and Turfing
	(Co)	30/6	Planting, sheets 1 and 2
	(Co)	30/7	Grass, Bulbs and Wildflower Maintenance
	(Co)	30/8	Watering
	(Co)	30/9	Establishment Maintenance for Planting
	(Co)	30/10	Maintenance of Established Trees and Shrubs
	(Co)	30/11	Management of Waterbodies
	(Co)	30/12	Special Ecological Measures
			MAINTENANCE PAINTING OF STEELWORK
	(C)(P)	50/1	(Specification for Highway Works) Form HA/P1 (Maintenance) Paint System Sheet
	(C)(P)	50/2	Requirements for Other Work
	(C)(P)	50/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
	(C)(P)	50/4	Form SEDD/P3 Paint Sample Dispatch List: Sheets 1 and 2
	(C)(P)	50/5	General Requirements

APPENDIX 0/3: LIST OF CONTRACT-SPECIFIC NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (Continued)

LIST 'B': List of Contract – Specific Numbered Appendices devised for the Contract

Volume Number	Completed by	Appendix Number	Title
	(Co)(C)	0/7	Training and Employment Opportunities
	(Co)(C)	1/70	Site Safety

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT

1. CONTRACT SPECIFIC DRAWINGS SUPPLIED TO EACH TENDERER, CONTAINED IN VOLUME 5 OF THE CONTRACT

Drawing Number	Revision	Title
Land Made Available Drawings		
B1557602/CD/LMA/KP1	3	Land Made Available by the Employer for the Works (Key Plan)
B1557602/CD/LMA/001	6	Land Made Available by the Employer for the Works (Sheet 1 of 9)
B1557602/CD/LMA/002	8	Land Made Available by the Employer for the Works (Sheet 2 of 9)
B1557602/CD/LMA/003	7	Land Made Available by the Employer for the Works (Sheet 3 of 9)
B1557602/CD/LMA/004	7	Land Made Available by the Employer for the Works (Sheet 4 of 9)
B1557602/CD/LMA/005	6	Land Made Available by the Employer for the Works (Sheet 5 of 9)
B1557602/CD/LMA/006	6	Land Made Available by the Employer for the Works (Sheet 6 of 9)
B1557602/CD/LMA/007	7	Land Made Available by the Employer for the Works (Sheet 7 of 9)
B1557602/CD/LMA/008	4	Land Made Available by the Employer for the Works (Sheet 8 of 9)
B1557602/CD/LMA/009	4	Land Made Available by the Employer for the Works (Sheet 9 of 9)

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Reference Drawings		
B1557602/CD/REF/KP1	2	Reference Drawing (Key Plan)
B1557602/CD/REF/001	3	Reference Drawing (Sheet 1 of 7)
B1557602/CD/REF/002	3	Reference Drawing (Sheet 2 of 7)
B1557602/CD/REF/003	3	Reference Drawing (Sheet 3 of 7)
B1557602/CD/REF/004	3	Reference Drawing (Sheet 4 of 7)
B1557602/CD/REF/005	5	Reference Drawing (Sheet 5 of 7)
B1557602/CD/REF/006	4	Reference Drawing (Sheet 6 of 7)
B1557602/CD/REF/007	3	Reference Drawing (Sheet 7 of 7)

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Indicative Undertakers Works Drawings		
British Telecom		
B1557602/CD/2721/KP1	0	BT Proposed Diversions (Key Plan)
B1557602/CD/2721/001	1	BT Proposed Diversions (Sheet 1 of 51)
B1557602/CD/2721/002	1	BT Proposed Diversions (Sheet 2 of 51)
B1557602/CD/2721/003	-	Not Used
B1557602/CD/2721/004	-	Not Used
B1557602/CD/2721/005	3	BT Proposed Diversions (Sheet 5 of 51)
B1557602/CD/2721/006	3	BT Proposed Diversions (Sheet 6 of 51)
B1557602/CD/2721/007	1	BT Proposed Diversions (Sheet 7 of 51)
B1557602/CD/2721/008	1	BT Proposed Diversions (Sheet 8 of 51)
B1557602/CD/2721/009	3	BT Proposed Diversions (Sheet 9 of 51)
B1557602/CD/2721/010	2	BT Proposed Diversions (Sheet 10 of 51)
B1557602/CD/2721/011	3	BT Proposed Diversions (Sheet 11 of 51)
B1557602/CD/2721/012	3	BT Proposed Diversions (Sheet 12 of 51)
B1557602/CD/2721/013	3	BT Proposed Diversions (Sheet 13 of 51)
B1557602/CD/2721/014	-	Not Used
B1557602/CD/2721/015	3	BT Proposed Diversions (Sheet 15 of 51)
B1557602/CD/2721/016	2	BT Proposed Diversions (Sheet 16 of 51)
B1557602/CD/2721/017	2	BT Proposed Diversions (Sheet 17 of 51)
B1557602/CD/2721/018	2	BT Proposed Diversions (Sheet 18 of 51)
B1557602/CD/2721/019	2	BT Proposed Diversions (Sheet 19 of 51)
B1557602/CD/2721/020	3	BT Proposed Diversions (Sheet 20 of 51)
B1557602/CD/2721/021	2	BT Proposed Diversions (Sheet 21 of 51)
B1557602/CD/2721/022	2	BT Proposed Diversions (Sheet 22 of 51)
B1557602/CD/2721/023	2	BT Proposed Diversions (Sheet 23 of 51)
B1557602/CD/2721/024	1	BT Proposed Diversions (Sheet 24 of 51)

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Indicative Undertakers Works Drawings (continued)		
B1557602/CD/2721/025	1	BT Proposed Diversions (Sheet 25 of 51)
B1557602/CD/2721/026	2	BT Proposed Diversions (Sheet 26 of 51)
B1557602/CD/2721/027	3	BT Proposed Diversions (Sheet 27 of 51)
B1557602/CD/2721/028	3	BT Proposed Diversions (Sheet 28 of 51)
B1557602/CD/2721/029	2	BT Proposed Diversions (Sheet 29 of 51)
B1557602/CD/2721/030	2	BT Proposed Diversions (Sheet 30 of 51)
B1557602/CD/2721/031	2	BT Proposed Diversions (Sheet 31 of 51)
B1557602/CD/2721/032	1	BT Proposed Diversions (Sheet 32 of 51)
B1557602/CD/2721/033	2	BT Proposed Diversions (Sheet 33 of 51)
B1557602/CD/2721/034	3	BT Proposed Diversions (Sheet 34 of 51)
B1557602/CD/2721/035	2	BT Proposed Diversions (Sheet 35 of 51)
B1557602/CD/2721/036	1	BT Proposed Diversions (Sheet 36 of 51)
B1557602/CD/2721/037	1	BT Proposed Diversions (Sheet 37 of 51)
B1557602/CD/2721/038	1	BT Proposed Diversions (Sheet 38 of 51)
B1557602/CD/2721/039	-	Not Used
B1557602/CD/2721/040	-	Not Used
B1557602/CD/2721/041	1	BT Proposed Diversions (Sheet 41 of 51)
B1557602/CD/2721/042	1	BT Proposed Diversions (Sheet 42 of 51)
B1557602/CD/2721/043	1	BT Proposed Diversions (Sheet 43 of 51)
B1557602/CD/2721/044	1	BT Proposed Diversions (Sheet 44 of 51)
B1557602/CD/2721/045 - 051	-	Not Used
Scottish Water		
B1557602/CD/2722/KP1	0	SW Proposed Diversions (Key Plan)
B1557602/CD/2722/001	-	Not Used
B1557602/CD/2722/002	3	SW Proposed Diversions (Sheet 2 of 51)
B1557602/CD/2722/003	3	SW Proposed Diversions (Sheet 3 of 51)

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Indicative Undertakers Works Drawings (continued)		
B1557602/CD/2722/004	4	SW Proposed Diversions (Sheet 4 of 51)
B1557602/CD/2722/005	3	SW Proposed Diversions (Sheet 5 of 51)
B1557602/CD/2722/006	3	SW Proposed Diversions (Sheet 6 of 51)
B1557602/CD/2722/007	2	SW Proposed Diversions (Sheet 7 of 51)
B1557602/CD/2722/008	3	SW Proposed Diversions (Sheet 8 of 51)
B1557602/CD/2722/009	2	SW Proposed Diversions (Sheet 9 of 51)
B1557602/CD/2722/010	2	SW Proposed Diversions (Sheet 10 of 51)
B1557602/CD/2722/011	2	SW Proposed Diversions (Sheet 11 of 51)
B1557602/CD/2722/012	2	SW Proposed Diversions (Sheet 12 of 51)
B1557602/CD/2722/013	2	SW Proposed Diversions (Sheet 13 of 51)
B1557602/CD/2722/014-015	-	Not Used
B1557602/CD/2722/016	2	SW Proposed Diversions (Sheet 16 of 51)
B1557602/CD/2722/017	-	Not Used
B1557602/CD/2722/018	3	SW Proposed Diversions (Sheet 18 of 51)
B1557602/CD/2722/019	2	SW Proposed Diversions (Sheet 19 of 51)
B1557602/CD/2722/020	2	SW Proposed Diversions (Sheet 20 of 51)
B1557602/CD/2722/021	2	SW Proposed Diversions (Sheet 21 of 51)
B1557602/CD/2722/022	2	SW Proposed Diversions (Sheet 22 of 51)
B1557602/CD/2722/023	4	SW Proposed Diversions (Sheet 23 of 51)
B1557602/CD/2722/024	4	SW Proposed Diversions (Sheet 24 of 51)
B1557602/CD/2722/025	2	SW Proposed Diversions (Sheet 25 of 51)
B1557602/CD/2722/026	2	SW Proposed Diversions (Sheet 26 of 51)
B1557602/CD/2722/027	2	SW Proposed Diversions (Sheet 27 of 51)
B1557602/CD/2722/028-030	-	Not Used
B1557602/CD/2722/031	2	SW Proposed Diversions (Sheet 31 of 51)
B1557602/CD/2722/032-048	-	Not Used

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Indicative Undertakers Works Drawings (continued)		
B1557602/CD/2722/049	2	SW Proposed Diversions (Sheet 49 of 51)
B1557602/CD/2722/050-051	-	Not Used
National Grid		
B1557602/CD/2723/KP1	0	National Grid Existing Apparatus (Key Plan)
B1557602/CD/2723/001-008	-	Not Used
B1557602/CD/2723/009	0	National Grid Existing Apparatus (Sheet 9 of 51)
B1557602/CD/2723/010-023	-	Not Used
B1557602/CD/2723/024	0	National Grid Existing Apparatus (Sheet 24 of 51)
B1557602/CD/2723/024-051	-	Not Used
Scottish and Southern Energy		
B1557602/CD/2724/KP1	2	SSE Proposed Diversions (Key Plan)
B1557602/CD/2724/001-004	-	Not Used
B1557602/CD/2724/005	4	SSE Proposed Diversions (Sheet 5 of 51)
B1557602/CD/2724/006	4	SSE Proposed Diversions (Sheet 6 of 51)
B1557602/CD/2724/007	3	SSE Proposed Diversions (Sheet 7 of 51)
B1557602/CD/2724/008	3	SSE Proposed Diversions (Sheet 8 of 51)
B1557602/CD/2724/009	4	SSE Proposed Diversions (Sheet 9 of 51)
B1557602/CD/2724/010	-	Not Used
B1557602/CD/2724/011	4	SSE Proposed Diversions (Sheet 11 of 51)
B1557602/CD/2724/012	4	SSE Proposed Diversions (Sheet 12 of 51)
B1557602/CD/2724/013-015	-	Not Used
B1557602/CD/2724/016	4	SSE Proposed Diversions (Sheet 16 of 51)
B1557602/CD/2724/017	4	SSE Proposed Diversions (Sheet 17 of 51)
B1557602/CD/2724/018	-	Not Used

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Indicative Undertakers Works Drawings (continued)		
B1557602/CD/2724/019	3	SSE Proposed Diversions (Sheet 19 of 51)
B1557602/CD/2724/020	3	SSE Proposed Diversions (Sheet 20 of 51)
B1557602/CD/2724/021	3	SSE Proposed Diversions (Sheet 21 of 51)
B1557602/CD/2724/022	3	SSE Proposed Diversions (Sheet 22 of 51)
B1557602/CD/2724/023	3	SSE Proposed Diversions (Sheet 23 of 51)
B1557602/CD/2724/024	3	SSE Proposed Diversions (Sheet 24 of 51)
B1557602/CD/2724/025	3	SSE Proposed Diversions (Sheet 25 of 51)
B1557602/CD/2724/026	3	SSE Proposed Diversions (Sheet 26 of 51)
B1557602/CD/2724/027	3	SSE Proposed Diversions (Sheet 27 of 51)
B1557602/CD/2724/028	-	Not Used
B1557602/CD/2724/029	3	SSE Proposed Diversions (Sheet 29 of 51)
B1557602/CD/2724/030	3	SSE Proposed Diversions (Sheet 30 of 51)
B1557602/CD/2724/031	-	Not Used
B1557602/CD/2724/032	3	SSE Proposed Diversions (Sheet 32 of 51)
B1557602/CD/2724/033-049	-	Not Used
B1557602/CD/2724/050	4	SSE Proposed Diversions (Sheet 50 of 51)
B1557602/CD/2724/051	3	SSE Proposed Diversions (Sheet 51 of 51)
SGN		
B1557602/CD/2726/KP1	0	SGN Existing Apparatus (Key Plan)
B1557602/CD/2726/001-045	-	Not Used
B1557602/CD/2726/046	0	SGN Existing Apparatus (Sheet 46 of 51)
B1557602/CD/2726/047	0	SGN Existing Apparatus (Sheet 47 of 51)
B1557602/CD/2726/048-051	-	Not Used

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Indicative Undertakers Works Drawings (continued)		
Cornerstone Telecommunications Infrastructure Limited		
B1557602/CD/2727/KP1	0	CTIL Existing Apparatus (Key Plan)
B1557602/CD/2727/001-034	-	Not Used
B1557602/CD/2727/035	1	CTIL Existing Apparatus (Sheet 35 of 51)
B1557602/CD/2727/036-051	-	Not Used

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Accommodation Works Drawings		
B1557602/AW/008/01	2	Accommodation Works, [REDACTED], Land Boundary Ref. 008 (Sheet 1 of 1)
B1557602/AW/028/01	3	Accommodation Works, [REDACTED], Land Boundary Ref. 028 (Sheet 1 of 2)
B1557602/AW/028/02	2	Accommodation Works, [REDACTED], Land Boundary Ref. 028 (Sheet 2 of 2)
B1557602/AW/083/01	4	Accommodation Works, [REDACTED], Land Boundary Ref. 083 (Sheet 1 of 4)
B1557602/AW/083/02	2	Accommodation Works, [REDACTED], Land Boundary Ref. 083 (Sheet 2 of 4)
B1557602/AW/083/03	2	Accommodation Works, [REDACTED], Land Boundary Ref. 083 (Sheet 3 of 4)
B1557602/AW/083/04	2	Accommodation Works, [REDACTED], Land Boundary Ref. 083 (Sheet 4 of 4)
B1557602/AW/085/01	1	Accommodation Works, [REDACTED], Land Boundary Ref. 085 (Sheet 1 of 1)
B1557602/AW/095/01	1	Accommodation Works, [REDACTED], Land Boundary Ref. 095 (Sheet 1 of 2)
B1557602/AW/095/02	1	Accommodation Works, [REDACTED], Land Boundary Ref. 095 (Sheet 2 of 2)
B1557602/AW/096/01	3	Accommodation Works, [REDACTED], Land Boundary Ref. 096 (Sheet 1 of 1)

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Accommodation Works Drawings (continued)		
B1557602/AW/100/01	1	Accommodation Works, [REDACTED], Land Boundary Ref. 100 (Sheet 1 of 1)
B1557602/AW/101/01	3	Accommodation Works, [REDACTED], Land Boundary Ref. 101 (Sheet 1 of 1)
B1557602/AW/102/01	1	Accommodation Works, [REDACTED], Land Boundary Ref. 102 (Sheet 1 of 2)
B1557602/AW/102/02	2	Accommodation Works, [REDACTED], Land Boundary Ref. 102 (Sheet 2 of 2)
B1557602/AW/104/01	-	Not Used
B1557602/AW/104/02	1	Accommodation Works, [REDACTED], Land Boundary Ref. 104 (Sheet 1 of 1)
B1557602/AW/109/01	3	Accommodation Works, [REDACTED], Land Boundary Ref. 109 (Sheet 1 of 1)
B1557602/AW/110/01	4	Accommodation Works, [REDACTED], Land Boundary Ref. 110 (Sheet 1 of 2)
B1557602/AW/110/02	3	Accommodation Works, [REDACTED], Land Boundary Ref. 110 (Sheet 2 of 2)
B1557602/AW/113/01	2	Accommodation Works, [REDACTED], Land Boundary Ref. 113 (Sheet 1 of 1)
B1557602/AW/124/01	1	Accommodation Works, [REDACTED], Land Boundary Ref. 124 (Sheet 1 of 1)

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Accommodation Works Drawings (continued)		
B1557602/AW/145/01	2	Accommodation Works, [REDACTED], Land Boundary Ref. 145 (Sheet 1 of 1)
B1557602/AW/186/01	0	Accommodation Works, [REDACTED], Land Boundary Ref. 186 (Sheet 1 of 1)
B1557602/AW/188/01	2	Accommodation Works, [REDACTED], Land Boundary Ref. 188 (Sheet 1 of 1)
B1557602/AW/194/01	3	Accommodation Works, [REDACTED], Land Boundary Ref. 194 (Sheet 1 of 5)
B1557602/AW/194/02	4	Accommodation Works, [REDACTED], Land Boundary Ref. 194 (Sheet 2 of 5)
B1557602/AW/194/03	3	Accommodation Works, [REDACTED], Land Boundary Ref. 194 (Sheet 3 of 5)
B1557602/AW/194/04	2	Accommodation Works, [REDACTED], Land Boundary Ref. 194 (Sheet 4 of 5)
B1557602/AW/194/05	2	Accommodation Works, [REDACTED], Land Boundary Ref. 194 (Sheet 5 of 5)

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Standard Details		
B1557602/CD/SD/F1	2	Standard Details, Fence Type F1, Timber Post and Four Rail Fence
B1557602/CD/SD/F5	2	Standard Details, Fence Type F5, Timber Post and Five Wire Fence
B1557602/CD/SD/F36	2	Standard Details, Fence Type F36, Deer Proof Fence
B1557602/CD/SD/F37	2	Standard Details, Fence Type F37, Stock Proof Fence, 6 Wire, Top Barbed
B1557602/CD/SD/F38	2	Standard Details, Fence Type F38, Timber Post and 6 Wire Fence
B1557602/CD/SD/F39	-	Not Used
B1557602/CD/SD/F40	2	Standard Details, Fence Type F40, Timber Post and 5 Wire Fence with Rabbit Netting
B1557602/CD/SD/F41	2	Standard Details, Fence Type F41, Timber Post and 5 Wire Fence, Top Barbed
B1557602/CD/SD/F42	-	Not Used
B1557602/CD/SD/F43	1	Standard Details, Fence Type F43, Deer Proof Fence with Rylock
B1557602/CD/SD/F44	3	Standard Details, Fence Type F44, Stock Proof Fence, Top Barbed
B1557602/CD/SD/F45	1	Standard Details, Fence Type F45, Timber Post and 7 Wire Fence, Top Two Barbed
B1557602/CD/SD/F46	1	Standard Details, Fence Type F46, Timber Post and 7 Wire Fence, Top Two Barbed with Rabbit Netting
B1557602/CD/SD/F47	1	Standard Details, Fence Type F47, Stock Proof Fence, 6 Wire, Top Barbed
B1557602/CD/SD/F48	1	Standard Details, Fence Type F48, Stock Proof Fence, 6 Wire, Top Barbed with Rabbit Netting
B1557602/CD/SD/F49	2	Standard Details, Fence Type F49, Stock Proof Fence, 6 Wire,
B1557602/CD/SD/G1	1	Standard Details, Gate Type G1, 3.6m Wide Steel Single Field Gate

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Standard Details (continued)		
B1557602/CD/SD/G2	-	Not Used
B1557602/CD/SD/G4	1	Standard Details, Gate Type G2, 7.2m Extra Wide Steel Double Field Gate
B1557602/CD/SD/G11	0	Standard Details, Gate Type G11, Deer Proof Gate

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Indicative Landscape and Planting Works Drawings		
B1557602/CD/LAN/001	3	Indicative Landscape and Planting Works (Sheet 1 of 17)
B1557602/CD/LAN/002	3	Indicative Landscape and Planting Works (Sheet 2 of 17)
B1557602/CD/LAN/003	3	Indicative Landscape and Planting Works (Sheet 3 of 17)
B1557602/CD/LAN/004	3	Indicative Landscape and Planting Works (Sheet 4 of 17)
B1557602/CD/LAN/005	3	Indicative Landscape and Planting Works (Sheet 5 of 17)
B1557602/CD/LAN/006	3	Indicative Landscape and Planting Works (Sheet 6 of 17)
B1557602/CD/LAN/007	3	Indicative Landscape and Planting Works (Sheet 7 of 17)
B1557602/CD/LAN/008	3	Indicative Landscape and Planting Works (Sheet 8 of 17)
B1557602/CD/LAN/009	3	Indicative Landscape and Planting Works (Sheet 9 of 17)
B1557602/CD/LAN/010	3	Indicative Landscape and Planting Works (Sheet 10 of 17)
B1557602/CD/LAN/011	3	Indicative Landscape and Planting Works (Sheet 11 of 17)
B1557602/CD/LAN/012	3	Indicative Landscape and Planting Works (Sheet 12 of 17)
B1557602/CD/LAN/013	3	Indicative Landscape and Planting Works (Sheet 13 of 17)
B1557602/CD/LAN/014	3	Indicative Landscape and Planting Works (Sheet 14 of 17)
B1557602/CD/LAN/015	3	Indicative Landscape and Planting Works (Sheet 15 of 17)
B1557602/CD/LAN/016	3	Indicative Landscape and Planting Works (Sheet 16 of 17)
B1557602/CD/LAN/017	3	Indicative Landscape and Planting Works (Sheet 17 of 17)

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

Drawing Number	Revision	Title
Indicative Landscape and Planting Works Drawings (continued)		
B1557602/CD/LAN/018	3	Indicative Landscape and Planting Works Planting Schedules (Sheet 1 of 1)

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

2. STANDARD DRAWINGS

2 (i) SUPPLIED TO EACH TENDERER

Drawing Number	Title
NDX1002 Series	Typical 600 Cabinet Layout Drawings
NDX1002-00dt	Typical Type 600 Cabinet Foundations
NDX1002-00ga	Typical HA Type 600 Cabinet Installations - Plinths
NDX1002-01dt	Typical HA 600 Cabinet Communications Cable Clamping, Earth Stud & General Earthing Detail
NDX1002-06dt	Typical Electrically Energised Communications Cabinet Labels
NDX1002-06no	Typical Electrically Energised Communications Cabinet Labels
NDX1010 Series	Typical CCTV Detail Drawings
NDX1010-00cl	Typical 10 & 15 Metre CCTV Mast, Cabinet Base and Paved Area
NDX1010-00ly	Typical Camera Site – Cabinet Layout
NDX1010-00ly	Typical Camera Site – Duct Layout
NDX1010-00wd	Typical Camera Site – Earthing Arrangement
NDX1011 Series	Typical Power Cabinet Detail Drawings
NDX1011-01dt	Typical Labels for Electrical Supply, Distribution & Other Electrical Supply Equipment Cabinets
NDX1011-01ga	Typical Electrical Supply & Distribution Cabinets Installation Detail
NDX1011-01no	Typical Item List and Notes for Type L, TP and TEDP Cabinets
NDX1011-01wd	Typical Traffic Electrical Distribution Pillar Type – TEDP 16mm sq to 35mm sq CSA Cables – LH Version
NDX1061 Series	Typical Cable Detail Drawings
NDX1061-00dt	Typical 20/30 to 2 Pair Cable Gland Conversion Kit Assembly Detail
NDX1061-00dt	Typical Method of Sealing Unused Cable Ends
NDX1061-00dt	Typical Cable Identification Labels
NDX1061-00dt	Typical Cable Termination and Continuity Kit Installation Multi Pair Cable
NDX1061-00dt	Typical Cable Termination and Continuity Kit Installation Multi Pair and Fibre Optic Cable

APPENDIX 0/4: LIST OF DRAWINGS INCLUDED IN THE CONTRACT (Continued)

NDX1063 Series	Typical Duct Detail Drawings
NDX1063-00cl	Typical Plan View of Ducted System Layout – Both Verges
NDX1063-00cl	Typical Plan View of Ducted System Layout – Single Verge
NDX1063-00dt	Typical Ducts
NDX1063-00dt	Typical Installation of Deep Transverse Ducts
NDX1063-00dt	Typical Duct Installation - Longitudinal
NDX1063-00dt	Typical Duct Installation – Local Ducts
NDX1063-00dt	Typical Duct Installation – Transverse Ducts
NDX1063-00dt	Typical Duct Installation – Spacers, Strapping and Longitudinal Duct Cable Allocation
NDX1063-00dt	Typical Duct Installation – Mechanical Duct Plugs
NDX1063-01ga	Typical Type A Chamber Construction Detail
NDX1063-02ga	Typical Type B Chamber Construction Detail
NDX1063-03ga	Typical Type C Chamber Construction Detail
NDX1063-04ga	Typical Type D Chamber Construction Detail Detector Loop Sites
NDX1063-04wd	Typical Loop Wiring in Roadside Chamber at Detector Loop Sites (PTC Joints)
NDX1063-05cl	Typical Ducting Emergency Telephone / Hazard Warning Signal Site
NDX1063-05cl	Typical Ducting at Intermediate Site (TB13)
NDX1070 Series	Typical Site Detail Drawings
NDX1070-02ga	Typical Site Access Safety Handrail Detail

2 (ii) INSPECTED BY TENDERERS

NOT USED

2 (iii) List of Drawings Brought into the Contract by Reference

Highway Construction Details (HCD) published by The Stationery Office (formerly HMSO) as Volume 3 of the Manual of Contract Documents for Highway Works contains the following drawings brought into the Contract by reference. Unless otherwise stated below the whole drawing is brought into the Contract.

Drawing Number	Title	Date	Aspect/Alternative(s) if Not Whole Drawing
HCD	All drawings other than those listed below.	Nov 08	

APPENDIX 0/5: SPECIAL NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATION OF SCOTLAND

The following Additions, Substitutions, Cancellations and minor alteration shall be made:

List of Substitute Clauses, Tables and Figures

Clause No	Title
All 1500	Substitute all clauses of the MCHW Series 1500 with: <i>NDS1500 Rev. 14.a: "The National Alterations of the Overseeing Organisation of Scotland – Traffic Scotland Series 1500"</i> The Contract Specific items detailed in Appendix 0/1 modify NDS 1500.

List of Minor Alterations Clauses, Tables and Figures

Clause No	Title
NONE	

APPENDIX 0/7: TRAINING AND EMPLOYMENT OPPORTUNITIES

1. Employability & Skills Plan (ESP)

- 1.1 The Contractor shall be required to provide the Employer with a completed version of the template Employment and Skills Plan (ESP) contained in Appendix 0/7, taking cognisance of the Construction Industry Training Board's (CITB) Client Based Approach (<https://www.citb.co.uk/national-skills-academy-for-construction/what-is-the-national-skills-academy-for-construction/client-based-approach/>). The output figures for the ESP are to indicate the minimum outputs for each month against the relevant Construction Industry Training Board Employment and Skills Areas contained in the ESP. The 'Summary – Planned Total' column in the ESP template is to be completed utilising the minimum CITB benchmark requirement figures for the Contract provided in Table 1 in Appendix 0/7. Guidance on the Employment and Skills Areas is included within Appendix 0/7. The Contractor is to use his own judgement as to what additional outputs he considers are achievable in relation to the Contract.

Table 1: Employment & Skills Areas - Benchmark Requirements

ESA Ref	Employment and Skills Area	Benchmark Requirement for Contract
1	Work Placements – Persons (Total of 1(a)+1(b))	12
1(a)	Work Placements (In education) - persons	
1(b)	Work Placements (Not in education) - persons	
2	Jobs created by a National Skills Academy for Construction (NSAfC) project (Total of 2(a)+2(b)+2(c))	30
2(a)	Jobs created by a NSAfC project (Apprentices)	
2(b)	Jobs created by a NSAfC project (New Entrants)	
2(c)	Jobs created by a NSAfC project (Graduates)	
3	Construction Careers Information, Advice & Guidance (CCIAG) Events	12
4	Training Weeks on site (Total of 4(a)+4(b)+4(c))	426
4(a)	Training Weeks on site (Apprenticeships)	
4(b)	Training Weeks on site (Graduates)	
4(c)	Training Weeks on site (New Entrants)	
5	Qualifying the Workforce – project workforce (Total of 5(a)+5(b)+5(c)+5(d))	90
5(a)	Qualifications gained (equivalent VQ2 and above) (Main Contractor)	
5(b)	Qualifications gained (equivalent VQ2 and above) (Sub-Contractor)	
5(c)	Industry certification gained (Main Contractor)	
5(d)	Industry certification gained (Sub-Contractor)	
6	Training Plans	2
7	Case Studies	4

APPENDIX 0/7: TRAINING AND EMPLOYMENT OPPORTUNITIES (Continued)

- 1.2 In relation to the Employment and Skills Area 5(a) listed in Table 1 the Contractor shall maintain the following training opportunity:
- (a) a minimum of 2 professional training site-based places for persons undertaking a professional engineering training scheme recognised and accredited by a national professional body (such as the Institution of Civil Engineers) and leading to membership of the professional body at technician or chartered level or equivalent.

2. Employment and Skills Plan (ESP) Method Statement

- 2.1 The Contractor is required to provide a detailed ESP Method Statement setting out how he intends to implement the employment and training requirements of the Employer and to deliver the ESP. The Method Statement should be restricted to 1000 words and clearly set out the proposed approach for delivery against the Employment and Skills Areas contained in Table 1. The ESP Method Statement should cover, as a minimum, the requirements listed in Table 2.

Table 2: ESP Method Statement Content Requirements

ESP Method Statement Content Requirements
Details of the person(s) in the organisation who will be responsible for managing the training scheme and overseeing the proposals
Details of the education and training providers who will be involved with the delivery of the ESP
Details of the types of accredited and non-accredited training expected to be offered and who are expected to be the main beneficiaries of this training
Details of the trades or occupational areas it is envisaged will be offering Apprenticeship opportunities
Details of the types of Apprenticeship expected to be offered (i.e. traditional, programme, Advanced etc.)
Details of how the target outputs as set out in the ESP will be delivered
Details of how health and safety training will be managed
Details of the actions that will be taken to ensure the support of sub-contractors working on the project
Details of how compliance will be managed (and monitored) with respect to the organising subcontractors

3. Reporting Requirements

- 3.1 The Contractor shall provide to the Employer the following reports, (a) and (b)) on a monthly basis:
- (a) A report on a monthly basis, outlining the achievements during the previous month against the ESP and ESP Method Statement and shall provide details of the various employment and skills activities delivered in the month. The Employer will monitor the Contractor's compliance with and implementation of the ESP and ESP Method Statement. The template ESP provided in Appendix 0/7 is suitable for monthly reporting. Documentary evidence (electronic or hard copy) to support validation of each activity shall be collated by the Contractor and filed in date order under each benefit heading. On receipt of each monthly report the Engineer will validate the delivery of benefits, querying as necessary any evidence that is unclear or inconclusive.

APPENDIX 0/7: TRAINING AND EMPLOYMENT OPPORTUNITIES (Continued)

The Engineer will send a copy of the validated monthly report to Transport Scotland, who may, at any time, carry out monitoring, spot checks or audit the delivery of benefits. A report on a monthly basis, identifying the following information:

For the Contractor:

- (i) numbers of staff employed on site broken down by postcode; and
- (ii) number of staff providing head office support to the site.

For all Contractor Parties:

- (i) numbers of staff employed on site broken down by postcode;
 - (ii) the total number of staff broken down by postcode providing head office support to the site; and
 - (iii) the Company Reference Number as registered at Companies House for each Contractor Party.
- (b) A report on a monthly basis, in relation to the wider community benefits being delivered, a report covering the data requirements contained in Table 3. Such reporting forms part of the Employer's reporting obligations under the Procurement Reform (Scotland) Act 2014 and in accordance with the Scottish Governments requirements.

Table 3: Community Benefit Reporting Requirements

Ref	ESA Ref	Reporting Criteria	Measure	Monthly Total	Cumulative Total
CB1	ESA 2	Number of vacancies filled by priority groups*	1 job (vacancy)		
CB2	ESA 2(a)	Number of apprenticeships filled by priority groups*	1 job (apprenticeship)		
CB3	ESA 2(a)	Number of apprenticeships recruited to deliver contract	1 person (apprentice)		
CB4	ESA 1(b)	Number of work placements for priority groups*	1 completed placement		
CB5	ESA 1(a)	Number of work placements for school pupils, college and university students	1 completed placement		
CB6	ESA 4&5	Number of qualifications achieved through training by priority groups*	1 qualification/certification		

APPENDIX 0/7: TRAINING AND EMPLOYMENT OPPORTUNITIES (Continued)

Ref	ESA Ref	Reporting Criteria	Measure	Monthly Total	Cumulative Total
CB7	ESA 4&5	Number of qualifications achieved through training by other employees	1 qualification/certification		
CB8	ESA 2	Number of recruits from priority groups* employed at 26 weeks after job start	1 person		
CB9	ESA 2(b)	Number of apprenticeships from priority groups* employed at 26 weeks after apprenticeship start	1 person		
CB10	ESA 1&2	Number of work placements for priority groups* subsequently recruited by Contractor/Sub-Contractor	1 person		
CB11	-	Total number of jobs advertised through local job centres	1 job		
CB12	ESA 2	Number of jobs filled by priority groups*	1 job		
CB13	-	Number recruited to deliver Contract	1 person		
CB14	-	Number of sub-contracts awarded to Small to Medium Enterprises SMEs	1 contract		
CB15	-	Value of sub-contracts awarded to Small to Medium Enterprises (SMEs)	£ value		
CB16	-	Number of sub-contracts awarded to Social Enterprises	1 contract		

APPENDIX 0/7: TRAINING AND EMPLOYMENT OPPORTUNITIES (Continued)

Ref	ESA Ref	Reporting Criteria	Measure	Monthly Total	Cumulative Total
CB17	-	Value of sub-contracts awarded to Social Enterprises	£ value		
CB18	-	Number of sub-contracts awarded to Supported Businesses	1 contract		
CB19	-	Value of sub-contracts awarded to Supported Businesses	£ value		
CB20	-	Number of sub-contracts advertised via Public Contracts Scotland portal	1 sub-contract		
CB21	ESA 3	Community Engagement Activities	Individual activity		

* Priority groups include young people, unemployed & disadvantaged groups

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION

1. Accommodation Required

1.1 Office Accommodation for Period 1 defined in Section 11 of this Appendix.

An integrated office-building facility comprising accommodation for shared occupation by the Overseeing Organisation and the Contractor shall be provided by the Contractor with single joint entrance and reception area, including shared conference room and messing facilities, car parking and security arrangements.

The office building shall be constructed of secure 'anti-vandal' steel shell office-accommodation units or any system, which is deemed suitable for temporary accommodation of this nature, which is acceptable to the Overseeing Organisation.

The office-building facility shall be connected to existing water, 240 volt AC electricity supply, and telecommunication utilities for provision of water, heating, lighting and telephone. Sewage disposal shall be either direct to existing piped mains facility or specially provided septic tanks which shall be regularly serviced. The Office Building shall comply with and be maintained to comply with the Construction (Health, Safety and Welfare) Regulations 1996. The Electricity at Work Regulations 1989 shall be complied with in all respects in case of equipment and furnishing of rooms in the office-building. Prior to occupation the Contractor shall have the Building appropriately certified by the local authority and fire brigade as suitable for occupation and use intended.

The office accommodation for the use of the Overseeing Organisation and all facilities to be shared with the Contractor shall be to a high standard of, including for but not limited to, structural integrity, aesthetics, internal finishing, equipment and furniture as described below. The location and layout of the integrated office facility shall be wholly acceptable to the Overseeing Organisation whilst conveniently located in close proximity to, and possibly overlooking, the construction works. At the same time the integrated office-building facility shall be set apart from the Contractor's site operations plant store and depot and routes used by construction traffic.

The office-building shall also be provided with a separate entrance and lobby area away from the main entrance, conveniently located within its layout for direct access by personnel of the Employer and Engineer's Representative and Contractor when either visiting or returning from the construction site for purpose of changing into or removing/cleaning and storing boots and safety gear.

Raised doorway entrances and access ways to the office building that have steps/stairway approaches shall have tubular steel handrails fitted either side of the access stairway.

The Contractor shall form access from the public road a minimum of 3 metres wide and provide car parking allowing space for 8 No. Overseeing Organisation vehicles and 4 visitor's cars. The roads and car park shall have a bituminous surface. The road access shall be kept clear of mud and debris and shall not be used by construction plant.

Fire exit routes from the offices shall be of concrete slabs or bituminous surface free from steps and other obstacles constructed so as to enable rapid and efficient drainage. All road surfaces and access to the public road connected with the office –building shall be constructed on a prepared ground and covered with bituminous surfacing and have positive drainage.

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

1.1 Office Accommodation for Period 1 defined in Section 11 of this Appendix. (Continued)

The Overseeing Organisation shall be consulted by the Contractor on the entire integrated layout and specification of the office-building facility that the Contractor intends to provide based on the requirements stated in this Appendix, and shall obtain the approval of the Overseeing Organisation prior to commencement of any work in connection with the building facility.

The integrated office-building (or units) facility shall be adequately guarded at all times to ensure no unlawful or unauthorised entry.

The integrated office-buildings (or units) facility shall fulfil the following construction requirements and operational conditions as a minimum requirement:

The office building shall be erected on pre-prepared under-building of brick or concrete dwarf walls founded on concrete strip-footings with damp-proof course. The underside of the external walls and floors of the office-building shall not be less than 400 millimetres above surrounding ground level. Floors of the office shall be of tongue and groove timber, lined with hardboard or plywood and covered with vinyl floor covering. External walls shall contain a suitable vapour barrier and a 25 millimetres layer of glass wool or equivalent insulation. Internal walls shall be smooth with coloured oil based paint. Headroom shall be not less than 2.25 metres. Ceilings shall be plasterboard covered on top with 25 millimetres layer of glass wool insulation and finished with two coats of white water based paint. The office-building shall be completely weatherproof and watertight. Windows shall comprise double-glazed sealed units or equivalent with window-area being not less than 2 square metres for every 10 square metres of floor area and with each window having opening facility for at least one-third of the window size. All windows shall be fitted with external roller-blinds operated internally for purpose of security and Venetian-type blinds shall be fitted internally.

All pipe-work shall be suitably lagged and/or insulated to prevent freezing.

All internal doors to rooms shall be fitted with mortice-locks and 2 [all] sets of keys for rooms occupied by the Overseeing Organisation and its Representatives shall be handed over to the Overseeing Organisation. The Contractor shall record the distribution of all room-keys and control additional issue of room-keys. The external doors shall be fitted with draught excluders and mortice locks, whilst the doors to the entrance and reception area shall be fitted with an electronic opening and closing / locking device operated by means of electronic smart-card. The Contractor shall provide smart-cards for use by individuals in the Overseeing Organisation and shall record the distribution of all smart-cards.

The offices shall be provided with 240 volt AC electricity supply with 13 amp socket outlets suitably spaced and provided around the office on the basis of 2 dual gang socket for each 5 square metres of office space.

Within the integrated office-building facility, the Contractor shall provide individual office space / rooms for the sole use of the Overseeing Organisation's staff excepting in cases where staff and /or representatives of the Overseeing Organisation and the Contractor are carrying out comparable duties in which case such office space and rooms shall be occupied by Overseeing Organisation and the Contractor.

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

1.1 Office Accommodation for Period 1 defined in Section 11 of this Appendix. (Continued)

The office-building facility including both individual office space/rooms and the jointly occupied office space/rooms and facilities provided for use by the Overseeing Organisation shall include furniture, fixtures and fittings, equipment, stores, protective clothing, and surveying equipment and supplies as listed below, for the Overseeing Organisation's exclusive use and shall be regarded as the minimum requirement.

All furniture, fixtures and fittings, equipment, stores, protective clothing, and surveying equipment computers, computer peripherals software and all supplies for the Overseeing Organisation's exclusive use shall be new and unused.

Complete security, privacy and confidentiality shall be ensured at all times in the rooms and for all facilities including computers and peripherals which are provided for contract administration activities undertaken by the Overseeing Organisation as described below.

All the telecommunication lines and facilities provided for use by the Overseeing Organisation as described below, shall be completely independent of the Contractor's facilities, to ensure privacy and confidentiality and shall be as a separate account.

The room - layout and particular room requirements of that part of the office-building facility occupied by the Overseeing Organisation and its Representatives shall have minimum floor areas as listed in the table immediately below:

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

ROOM DESCRIPTION	REF	AREA (SQ METRES)	PARTICULAR REQUIREMENTS
Overseeing Organisation			
Overseeing Organisation	A	20	
Reception (with waiting area) - telephone and security desk	B	20	Shared / Managed by Contractor
Conference Room	C	40	Located near main entrance and reception
Engineer's Representative and Staff			
Engineer's Representative	D	20	Adjoining room E/accessed through E
Secretary / Administration	E	16	Located near reception
Senior Site Engineers (2)	F	16	
Senior Site Engineers / Site Engineers(3)	G	20	
Assistant Site Engineers (3)	H	20	
Room for printer/photocopier	I	10	Room adjoining room E but with common access off corridor and not accessed through room E.
Inspectors and part time Engineers / ECoW (4)	J	24	
Storage room	K	12	
General Shared Facilities			
Kitchen - cooking and dish washing facilities	L	20	Shared with Contractor
Dining Area with drinking water dispenser	M	20	Shared with Contractor
Lobby Area / Boot Room	N	10	Shared with Contractor
Male Toilet Facilities – Linked with P	O	15	Shared with Contractor
Male Shower Closet and changing area - Accessed via O	P	5	Shared with Contractor
Female Toilet Facilities – Linked with R	Q	10	Shared with Contractor
Female Shower Closet and changing area - Accessed via Q	R	5	Shared with Contractor

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

A regularly serviced supply of cooled bottled drinking water and dispensing device shall be provided in the kitchen area.

The management and administration system implemented by the Contractor shall include for effective and advance allocation of the shared conference room facility to meet the requirements of both the Overseeing Organisation and the Contractor.

The office building shall be properly cleaned and serviced at least once per working day, for so long as it is in use with essential cleaning and servicing being carried out outside normal Site working hours but not without presence of office security or other authorised personnel.

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

1.2 Office Accommodation for Period 2 of the Works as defined in Section 11 of this Appendix

A reduced office requirement shall be provided for use by the Overseeing Organisation for Period 2 over the duration stated in Section 11 of this Appendix while maintaining equal standard of provision and service as for Period 1.

The office layout or area of office accommodation that is to remain occupied shall be as agreed by the Overseeing Organisation such as to fulfil the requirements of the Overseeing Organisation and its Representatives for Period 2. The area of office accommodation in the table herewith below is indicative of such requirements which are the minimum.

ROOM DESCRIPTION	REFERENCE	AREA (SQ. METRES)
Overseeing Organisation	A	20
Conference Room	C	40
Office	D	20
Office	E	16
Room for printer/photocopier	I	10
Office	F typical	16
Storage room	K	12
Kitchen facilities	L	Shared with Contractor
Male Toilets	O	Shared with Contractor
Female Toilet	Q	Shared with Contractor

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

2. Furnishings and Fitments

ROOM A Overseeing Organisation

Quantity	Item
2	Independent telephone and ISDN lines
1	Telephone
2	1.8 metres by 1.0 metres double pedestal desk with locking drawers with side unit with veneered surface
2	5 point swivel wheeled desk armchair fully adjustable
1	Meeting table; 2 metres long by 1 metre wide or similar with veneered surface with 4 padded chairs
2	White Marker Board 1m x 1.5m (with supply markers) mounted on wall at appropriate position
2	2 Full height secure PPE lockers
4	Coat hooks
1	Wastepaper bin
1	Paper punch and stapler
1	Set / 4 tier filing trays
3	Cat 5 (RJ45) surface mounted boxes – connected to LAN
1	Stand alone A3/A4 colour printer with installation software
3	Laptop as per Section 4.1 and 4.3 below

ROOM C Conference Room

Quantity	Item
1	Conference table 6 metres by 1.5 metres or similar approved
20	Conference chairs
1	1m deep framed cork or strawboard mounted on length of one wall at appropriate height
1	White Marker Board 1m x 1.5m (with supply markers) mounted on wall at appropriate position.
2	Cat 5 (RJ45) surface mount boxes – connected to LAN
1	Conference call speaker phone

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

ROOM D (Engineer's Representative)

Quantity	Item
1	Telephone
1	1.8 metres by 1.0 metres double pedestal desk with locking drawers and side unit with veneered surface
1	5 point swivel wheeled desk armchair fully adjustable
1	Meeting table 2 metres x 1 metre with veneered surface with 4 padded chairs
1	Plan chest A0 size with 6 drawers or Vertical plan-file
2	Padded office arm chairs
1	Lockable steel cupboard 1.2 metres by 1.8 metres minimum
1	Lockable 4 drawer steel filing cabinet, each drawer complete with hangers
1	Framed cork or strawboard panelling wall board mounted 3mx1m
1	White Marker Board 1.5mx1m
1	Glass fronted bookcase 1.5 metres wide by 1.0 metres high
4	Coat hooks
1	Wastepaper bin
1	Paper punch and stapler
1	Set / 4 tier filing trays
1	3 metres of 225 millimetres by 25 millimetres shelving
2	Cat 5 (RJ45) surface mount boxes – connected to hub (LAN)
1	Laptop as per Section 4.1 and 4.3 below

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

ROOM E (Secretary / Administration)

Quantity	Item
1	1.8 m by 1.0m secretarial work station with side desk with locking drawers with veneered surface
1	5 point swivel wheeled armchair fully adjustable
1	Work -table 2 metres x 1 metre wide with veneered surface
1	Office chair
2	Lockable steel cupboard 1.2 metres by 1.8 metres minimum
4	Lockable 4 drawer steel filing cabinet, each drawer complete with hangers
1	Framed cork or strawboard panelling wall board mounted 3mx1m
6	Coat hooks
1	Wastepaper bin
1	Paper punch and stapler
2	Set/ 4 tier filing tray
2	Cat 5 (RJ45) surface mount boxes – connected to hub (LAN)
1	Telephone
1	Document shredder - business type fully mounted with disposal container.
1	Laptop as per Section 4.1 and 4.3 below
Supply of	A4 and A3 copying paper as required for photocopier and word processing for duration of Period

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

ROOM F, G and H -**Senior Site Engineers / Site Engineers (4 personnel) and Assistant Site Engineers (3 personnel)**

Quantity	Item
1 per person	Telephone
1 per person	1.8 metres by 1.0 metres double pedestal desk with locking drawers and side unit with veneered surface
1 per person	5 point swivel wheeled armchair fully adjustable
1 per room	Table / bench 3.0 metres by 1.0 metres 1 metre above floor level
1 per room	Plan chest A0 size with 6 drawers or Vertical plan-file
1 per person	5 point swivel wheeled chair
1 per person	Lockable steel cupboard 1.2 metres by 1.8 metres minimum
1 per person	Lockable 4 drawer, steel filing cabinet, each drawer complete with A4 hangers
1 per room	White Marker Board 1m x 1.5m (with supply markers) mounted on wall at appropriate position
1 per person	Glass fronted bookcase 1.5 metres wide by 1.0 metres high
1 set per room	Coat hooks (4)
1 per person	Wastepaper bin
1 per person	Paper punch and stapler
1 per person	4 tier beanstalk filing tray with base
1 set per room	6metres of 225 millimetres shelving
1 per person	Cat 5 (RJ45) surface mount boxes – connected to LAN
1 per person	Laptop as per Section 4.1 and 4.3 below

ROOM I (ER's Printer/Photocopier Room)

Quantity	Item
1	Network colour printer copier scanner with e-mail facility, document feeder and sorting collating facility for exclusive use of the Overseeing Organisation as per Section 4.3.2 below
1	Work - table 2m x 1m with veneered surface
1	Storage cupboard for supplies, paper etc. (lockable)

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

ROOM J – Inspectors and part time engineer (4 personnel)

Quantity	Item
4	Telephone
4	1.5 metres by 1.0 metres double pedestal desk with locking drawers with veneered surface
4	5 point swivel wheeled armchair fully adjustable
1	Work table 3.0 metres by 1.0 metres with veneered surface
2	Office chairs
1	Plan chest A0 size with 6 drawers
1	Vertical Plan file (open hangers)
1	Lockable 4 drawer, steel filing cabinet, each drawer complete with vertical hangers
2	3 metres x 1 metre framed cork or strawboard panelling mounted on wall 1.0 metres above floor
3	3 metre long shelves 225 millimetres by 25 millimetres
4	Coat hooks
4	Wastepaper bin
4	Set /4 tier filing tray
4	Cat 5 (RJ45) surface mount boxes – connected to LAN
4	Laptop as per Section 4.1 and 4.3 below

ROOM K Storage Room

Quantity	Item
1	10 metres shelving
1	Storage racks for survey equipment
2	Lockable steel cabinet 1.0 metres wide by 2.0 metres high with shelving

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

ROOMS L and M Kitchen and Dining Area

Quantity	Item
1	Stainless steel sink with draining board, complete with cupboards and Formica worktop, hot and cold water supply
1	Dishwasher
1 set	'King size' waste (segregated recycling) bins complete with supply of liners
1	Wall mounted cupboard 2.0 metres long
1	Base unit 2.0 metres long with drawers and cupboards complete with Formica worktop 3.5 metres long
1	Electric water urn, with filling facilities
1	3 pint electric kettle with automatic switch-off
1	3 pint teapot
1	3 pint coffee pot
1	6 cubic feet refrigerator
1	800 watt microwave with turntable
1	Cold water drinking dispenser
1	Fire extinguishers
1	Fire blanket
1	Window mounted powered extractor fan
1	First aid kit complying with the requirements of the Health and Safety (First Aid) Regulations 1981.
1 set	Crockery, cutlery and cooking utensils for 10 persons or as required by the Overseeing Organisation (to be replaced as required)
	Supply of tea, coffee, milk and sugar (replenished as required during periods)
	Supply of towels (replenished and laundered during periods)
Min 3 sets	Table and 4 chairs

ROOM N Lobby Area / Boot Room

Quantity	Item
2	Timber bench (or fixed seating) 2 metres long
10	Personal metal lockers
1	Clothes drying rack with tubular heater and 8/10 number coat hooks

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

ROOMS O and P Male Toilet Facilities and Shower Unit

Quantity	Item
3	WC suites
3	Toilet roll holders and supply of toilet rolls
3	Bowl type urinals complete with auto-flush
3	Wash-hand basins complete with taps and hot and cold water supply
2	Towel dispensers laundered and replenished when required
2	Liquid soap dispensers with supply of liquid soap, or supply of soap
1	Electric wall-mounted hand drier
1	Wall mirror
4	Coat hooks
1	Window mounted powered extractor fan
1	Shower unit and changing area in separate compartment with door off main toilet area

ROOMS Q and R Female Toilet Facilities

Quantity	Item
2	WC suites
2	Toilet roll holders and supply of toilet rolls
1	Wash-hand basins complete with taps and hot and cold water supply
1	Towel dispensers laundered and replenished when required
1	Electric wall-mounted hand drier
1	Liquid soap dispensers with supply of liquid soap, or supply of soap
1	Sanitary bin
2	Wall mirrors
3	Coat hooks
1	Window mounted powered extractor fan
1	Shower unit and changing area in separate compartment with door off main toilet area

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

3. Weather Recording Apparatus

The Contractor shall set up and maintain, at a position to be determined by the Overseeing Organisation, a set of apparatus comprising: maximum/minimum thermometer in a standard shelter and a rain gauge for daily reading. The Contractor shall supply and maintain a portable anemometer provided with tripod and recording device.

4. Computer Equipment

All the equipment listed below shall be maintained by the Contractor up to the issue of the Certificate of Completion for the whole Works plus 3 months unless otherwise stated. The equipment will be installed and commissioned by a reputable Quality Assured supplier (BS EN9001). The equipment will be covered by a hardware maintenance contract with an eight hour maximum response time for repair or replacement. Equipment is to be installed in the respective rooms described above in the preceding Section 2 according to the details specified below; these are regarded as typical and alternative suppliers may be considered; the details of the entire package of computers and peripherals shall however be agreed with the Engineer.

4.1 Laptop / notebook computers – (to be retained by the allocated users for the duration of the Period of Maintenance)

Dell Latitude E7450 or similar mid range light-weight laptop approved by the Engineer	
Processor type	Intel® Core™ i5 Mobile processor • Intel® Core i5 • 2.53GHz (minimum)
Operating system installed	Genuine Microsoft® Windows® 7 Professional 64-bit
Compatible operating systems	Genuine Windows Vista® Business 64-bit, Genuine Windows Vista® Enterprise, SuSE Linux Enterprise Desktop 10
Display type	WXGA
Display size	14.1 inches diagonal
Product weight	Maximum Weight 2.2kg
Product dimensions (W x D x H)	3.1 (at front) x 33.1 x 24.3 cm
Battery life	Up to 8 hours
System features	
Internal drives	256 GB
Hard disk drive speed	7200 rpm
Optical drives	LightScribe DVD+/-RW SuperMulti with Double Layer Fixed
Standard memory	8 GB RAM (minimum)
Chipset	nVIDIA Quadro NVS Graphics Card (minimum)
Portability	
Product weight	Maximum Weight 2.2kg
Product dimensions (W x D x H)	3.1 (at front) x 33.1 x 24.3 cm
Display type	WXGA
Display size	14.1 inches diagonal

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

Laptop / notebook computers – (continued)

Connectivity	
Wireless technologies	Intel 802.11a/b/g/n mini-pci card, Bluetooth; 3G Broadband Wireless integrated
Wireless capability	Yes
Modem	56K modem
Network interface	Intel Gigabit Network Connection (10/100/1000 NIC)
Expandability	
External I/O ports	3 USB 2.0 ports, VGA, stereo microphone in, stereo headphone/line out, Firewire (1394a), power connector, RJ-11, RJ-45
Graphic / audio	
Video resolutions description	1280 x 800 WXGA with camera
Audio	High Definition Audio, stereo speakers, stereo headphone/line out, stereo microphone in, integrated dual-microphone array
Other information	
Keyboard	Full-sized keyboard
Pointing device	Enhanced dual pointing devices (touchpad and pointstick) with scroll zone
Power features	Lithium-Ion battery
Power requirements	AC Adapter with Fast Charge, Spare power pack and cables, Car Charging lead.
Battery life	Up to 8 hours Extended Battery
Security management	McAfee Security Solution, Kensington Lock slot, HP Privacy Filter (optional)
Docking solution	Port Replicator and cabling for mounting in office. Port replicator to be lockable (with 2 keys provided) to allow secure fixing of computer if left in office outside of working hours. Security cable to be provided to connect between locking-point on port replicator and appropriate fixing at the other end mounted securely to the frame of the desk.
Monitor	Minimum 21.5" 1280x800 WXGA
Configuration management	Manufacturer Client Configuration Management Agent

4.2 Network (LAN)

The contractor shall provide the following:-

Facilities to allow for a minimum of twenty concurrent Virtual Private Network (VPN) connections via a high speed broadband solution with a minimum connection speed of 8Mb per VPN connection.

One desktop pc is required in order to function as a network server for the Overseeing Organisation. This shall have at least two hard drives (minimum capacity 2Tb each). The server shall have a degree of hardware redundancy built in by utilising hard drive mirroring or similar and an external USB drive (minimum capacity 8Tb) attached to back up data on the server each evening.

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

The network shall be installed by the Contractor to facilitate free access to internet and enable inter-office communication via email.

Facilities to allow for server back up held off-site.

4.3 Ancillary Equipment

4.3.1 Computer Software - All of which shall be the most up to date version available at the Date of Award of Contract

The latest versions of the following software shall be installed on each computer:

- Microsoft Office Professional
- Microsoft Outlook
- Firewall hardware (minimum frequency of updates to be weekly for the duration of the contract)
- Anti Virus software (minimum frequency of updates to be weekly for the duration of the contract)
- Photo editing/image handling software
- CD/DVD authoring/writing software
- Adobe reader
- Autodesk DWG True View and Autodesk DWF viewer
- Suitable software to download Total Station information

The Contractor shall provide 2 copies of AutoCAD LT, MS Project and 1 copy of Adobe Professional with licences to be installed on computers as directed by the Overseeing Organisation.

The software shall be installed on each computer while each full set of the disks and documentation must be supplied for each set of software installed to the Overseeing Organisation.

4.3.2 Copier/Printers

The following are required to be installed in the Rooms, as indicated in the respective tables in preceding Section 2.

1 No combined colour printer copier scanner with e-mail facility, document feeder and sorting collating facility for exclusive use of the Overseeing Organisation. It shall be capable of printing/scanning/copying to both A4 and A3 paper size, producing more than 20 A4 copies per minute. The equipment shall be provided new and installed and commissioned by a reputable Quality Assured supplier (BSEN9001). The equipment shall be covered by a hardware maintenance contract with a minimum eight hour maximum response time for repair or replacement. It shall be connected to the computer network (LAN) and must have associated network software and cabling. Paper and all consumables shall be supplied by the Contractor as required.

1 No stand alone A3 colour printer (with installation software) shall be provided in room A

4.3.3 Photographic and Video Equipment

Portable video camera (GoPro 4 or similar) and appropriate vehicle dashcam mounting kit, spare battery, charger, in-vehicle power supply, memory card (2 No) and memory card reader / transfer cable

4.4 Telephone System

The Contractor shall provide and maintain a telephone system to service the office accommodation for the use of the Overseeing Organisation.

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

The telephone system shall include sufficient cabling, routers, switches, terminals, telephones and the like such that each member of the Overseeing Organisation and its Representatives has an individual telephone in addition to the telephones provided by the Contractor for its staff.

The Contractor shall provide a general office telephone number, staffed by a receptionist at the offices at the Site compound. The telephone system shall include an appropriate telephone terminal for the receptionist to handle all incoming calls and forward calls to the appropriate staff member in the Overseeing Organisation's team.

The telephone system shall provide direct dial telephone numbers and internal extension numbers for each telephone and shall cater for internal calls between all personnel within the offices.

Each telephone shall provide voicemail, including allowing the recording of an individual voicemail message by the telephone user, and shall allow call management, including holding and transferring calls to other extensions on the telephone system.

The telephone system shall provide sufficient outside lines to allow calls to be made simultaneously from all telephones that form part of the telephone system.

The telephone system may be a network-based system. If the Contractor provides a network-based telephone system, the Contractor shall provide such higher specification of network and broadband system as may be necessary to ensure that the network and broadband provided for the Overseeing Organisation and its Representatives does not deliver a lesser level of performance to the network and broadband specified in Section 4.2 of this Appendix.

The Contractor shall provide and install a conference call speaker phone in room reference C as listed in Section 1.1 above. The conference phone shall as a minimum requirement be a tabletop phone console with integrated LCD display, keypad and loudspeaker, phone book allowing up to 25 entries, adjustable volume control for speaker and 3 microphones with up to 10 ft. microphone pickup range.

Room A, as listed in Section 1.1 above, shall also have 2 No. independent telephone lines and 2 No. ISDN connections in addition to the above.

5. Schedule of Surveying and Other Equipment

The following equipment shall be for the exclusive use of the Overseeing Organisation, and shall be as described, or equivalent. The Contractor shall be responsible for the supply of labour and materials for cleaning the equipment as well as maintaining any applicable certification for the equipment throughout the period of the Contract:

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

Quantity	Item
1	<p>Total Station with the following minimum equipment and specifications:</p> <ul style="list-style-type: none"> • Continuous angle encoder with standard deviation (ISO 17123-3) of 5" and minimum reading of 1" of arc. Accuracy 2mm + 2ppm (ISO 17123-4) with capability of measuring to 3km to a single prism. Capable of measuring to all types of prism targets including retro tape. Fitted with laser plummet. Endless horizontal and vertical drives. On-board memory for at least 10,000 data blocks board applications – surveying and orientation, free station, stakeout, tie distance, height transfers, reference line/arc, are calculations, remote height and hidden point. <p>Heavy duty tripod, tribrach, 2 sets internal batteries and charger, data transfer cable, detail pole and large circular prism with target plate.</p>
2	<p>Half transverse kit comprising a heavy duty wooden tripod, tribrach, carrier, optical plummet and prism.</p> <p>If GPS technology is being used on the contract then the Company must supply a GPS(GNSS) receiver to meet the following specifications:</p> <ol style="list-style-type: none"> (i) Completely cable-free 220 channel GNSS rover capable of tracking GPS frequencies (L1, L2, L2C & L5) and GLONASS frequencies (L1, L2). Fully integrated radio or GPRS modem capable of receiving RTCM 3.x and CMRx corrections. Receiver should be fully ruggedized to IP67 rating. (ii) Accuracy (RMS) in Kinematic mode of 8 millimetres+1ppm in plan and 15 millimetres +1ppm in height. Accuracy (RMS) in Network RTK mode of 8 millimetres +0.5ppm in plan and 15 millimetres +0.5ppm in height. (iii) Initialisation reliability should be >99.9% and standard time for initialisation should be less than 10 seconds. (iv) Logger at pole should be fully ruggedized (MIL-STD-810F); have a Windows Mobile operating system and a battery life of up to 30 hours. Application programs to be included – surveying, stakeout, reference line / arc, area calculations and roading. The roading program should support the reading and use of the industry standard MX GENIO format directly (without conversion to maintain integrity of the data). (v) Heavy duty wooden tripod, tribrach, GPS Tribrach adapter, 2 internal batteries, (2400Ah each) and detail pole. (vi) If a local transformation or calibration is being used by the Company, the parameters must be supplied. <p>While the total station / GNSS receiver must meet all the above requirements, the total station / GNSS receiver shall not be to any lesser specification than that used by the Contractor's staff and shall be compatible with the Contractor's method of setting out / setting out data and equipment.</p> <p>The Contractor shall provide training as requested by the Overseeing Organisation on the operation and use of the Total Station.</p>
1	<p>Automatic Level with (Minimum specification as follows: 30x magnification, accuracy per 1km double levelling of 0.8mm, Single measurement accuracy of 1.2mm at 30m), aluminium tripod, aluminium staff and detachable staff bubble.</p>

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

Quantity	Item
	Notwithstanding the above requirements, the automatic level shall not be to any lesser specification than that used by the Contractor's staff. The Contractor shall provide training as requested by the Overseeing Organisation on the operation and use of the automatic level.
1	Electronic cover meter (with facility for downloading to computer)
3	30 metre measuring steel tape
1	50 metre measuring fibron tape
2	30 metre measuring fibron tape
10	5 metre pocket measuring tapes
	To be renewed by the Contractor as required by the Overseeing Organisation
1	Universal straight edge with wedge gauge for measuring depressions
2	1.0m and 0.3m spirit levels
7	Rechargeable torch with batteries – replaced as required
10	LED head torches with batteries – replaced as required
-	Supply of waterproof marking chalk in various colours, spray road marking paint in various colours, pegs, rails, wooden stakes, nails, string and nylon line. Supplies to be renewed by the Contractor as and when required
3	Claw Hammer
2	Lump / Club Hammer
2	Maximum and minimum thermometers in weatherproof case
1	Intrinsically safe inspection lamp with supply of batteries or chargers
1	Gas detection apparatus with charger
1	Digital thermometer with material, surface and air probes

The contractor shall at any reasonable time make available for the use of the Engineer's Representative, his staff and others acting at his request, all appropriate safety equipment necessary to gain safe access to any part of the works. The Contractor shall provide all training and attendance necessary for the safe and effective use of equipment provided for the purpose of gaining access to the works

The Contractor shall make available to the Engineer the use of any other survey equipment on Site as required.

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

6. Supply of Documentation

The Contractor shall supply and maintain for the sole use of the Overseeing Organisation one copy, on compact disk from the Stationary Office, suitable for display on the equipment specified in section 4.1 of Appendix 1/1 of this Specification, of The Manual of Contract Documents for Highway Works and Design Manual for Roads and Bridges comprising:

Specification and Bill of Quantities

Volume 1	Specification for Highway Works
Volume 2	Notes for Guidance on the Specification for Highway Works
Volume 3	Highway Construction Details
Volume 4	Bills of Quantities for Highway Works

Design Manual for Roads and Bridges

Volume 1	Highway Structures: Approval Procedures and General Design
Volume 1a	Highway Structures: Approval Procedures and General Design
Volume 2	Highway Structures: Design (Substructures and Special Structures) Materials
Volume 2a	Highway Structures: Design (Substructures and Special Structures) Materials
Volume 3	Highway Structures: Inspection and Maintenance
Volume 3a	Highway Structures: Inspection and Maintenance
Volume 3b	Highway Structures: Inspection and Maintenance
Volume 4	Geotechnics and Drainage
Volume 4a	Geotechnics and Drainage
Volume 5	Assessment and Preparation of Road Scheme
Volume 6	Road Geometry
Volume 7	Pavement Design and Maintenance
Volume 8	Traffic Signs and Lighting
Volume 10	Environmental Design and Management
Volume 10a	Environmental Design and Management
Volume 11	Environmental Assessment
Volume 12	Traffic Appraisal of Roads Schemes
Volume 12a	Traffic Appraisal of Roads Schemes

Traffic Signs Manual

- 1 Copy of Chapter 8 of the Traffic Signs Manual published by the Stationary Office Ltd.
- 1 Copy of Traffic Sign Regulation and General Directions.

British Standards and TRRL Publications

1 Copy of each current British Standard and Code of Practice or computerised equivalent all as referred to or cross referenced in the Contract.

1 Copy of each relevant Road Note

All volumes shall be current at the reference date as specified in Appendix A to Form of Tender.

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

7. Safety and Protective Clothing

Sets of the following to be supplied new within 4 weeks after Date of commencement of the Works in sizes as required by the Overseeing Organisation.

Quantity	Item
18 pairs	Wellington Boots with steel toe cap and mid-sole (type to be as agreed by Engineer's Representative)
18 pairs	Waterproof and breathable Protective Safety Boots with steel toe cap and mid-sole (type to be as agreed by Engineer's Representative)
18	Fleece Jacket 380g/m with 2 zipped pockets and draw cord hem. (type to be as agreed by Engineer's Representative)
18	Two band and brace high visibility yellow coats made from high performance waterproof and breathable fabric conforming to BS EN 471 Class 3 and BS EN 343 Class 3 : 3. (GORE-TEX or equivalent type to be as agreed with by Engineer's Representative)
18 pairs	Waterproof over trousers, high visibility to BS EN 471 Class 3 (type to be as agreed by Engineer's Representative)
18 pairs	Poly/cotton work trousers, high visibility to BS EN 471 Class 3 (type to be as agreed by Engineer's Representative)
18	Safety helmets with comfort band chin straps, built in eye protection, detachable ear defenders and detachable thermal insulation
18 pairs	Industrial penetration resistant waterproof gloves
18 pairs	Industrial thermally insulated work gloves
18	High visibility long sleeve vests to BS EN 471 Class 3
36 pairs	Thermally insulated socks
18 pairs	Safety glasses / goggles
Additional protective clothing for up to 5 visitors shall be made available on request, for periods of up to one day, comprising 5 No. sets high visibility waterproof anorak and safety helmets plus any other equipment utilised on site as standard / minimum requirement PPE.	
The Contractor shall make available for the use of the Engineer's Representative and/or his staff, all appropriate safety equipment necessary to gain safe access to any part of the works at any reasonable time. The Contractor shall provide all training and attendance necessary for the safe and effective use of equipment provided for the purpose of gaining access to the works	

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

8. Initial Consumable Stores

The Contractor shall provide regular supplies of consumable items such as those identified in the list below as required for the sole use of the Overseeing Organisation; the quantity stated for each item in the list below is to be supplied immediately or within reasonable time after Date of commencement of the Works.

Quantity	Description
20	A4 lever arch files with dust covers
20	A4 ring binder files
20	Set A4 file indices (plastic) (A - Z or 1 – 20)
8	Set A4 file dividers
6	A4 fold over clipboards
12	A4 pads ruled feint and margin (200 sheets)
2	A4 pads graph paper
1	A3 pads graph paper
12	Ruled all weather cover A6 notebook
13	Ruled hard cover A4 books
2	Box USB storage device (minimum 16Gb each - 25 per box)
2	Box 25 millimetres paper clips
1	Box large drawing pins
4	Bottle white correction fluid
20	Ball point pens (black)
20	Ball point pens (blue)
20	Ball point pens (red)
12	Felt tip pens (Fineliner or equivalent) (black)
12	Felt tip pens (Fineliner or equivalent) (red)
12	Felt tip pens (Fineliner or equivalent) (green)
12	Pencils (HB)
1	Box coloured pencils (12 assorted)
3	Pencil Sharpeners
5	Pack highlighter marker pens (6 assorted)
75	A4 manila envelopes
75	DL gummed envelopes
5	Stick adhesive (Pritt stick or equivalent)
5	Roll sellotape with dispenser (25 millimetres wide)
5	Roll invisible tape with dispenser (25 millimetres wide)

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION (Continued)

Quantity	Description
20	"Post it" note pads 76 x 127 millimetres
4	Roll drafting tape
1	Time and date received dial stamp
1	Stamp pad with black ink
20	A4 document wallet
100	A4 clear plastic file pockets (top opening)
100	Suspension files with tabs and inserts

9. Office Insurance

The Contractor shall provide for the insurance against all risks, of the contents of the offices including the property of the Overseeing Organisation and his staff together with any staff of the Employer who may visit the offices from time to time. This includes personal effects required in the normal course of duty and other computer equipment supplied by the Overseeing Organisation and/or the Employer.

10. Heating and Lighting

The offices shall be adequately provided with electric heating capable of maintaining a uniform room temperature of at least 20 degrees centigrade and shall be lit with electrical fluorescent diffused lighting to a standard acceptable for a drawing office to achieve a minimum of 500 lux measured at drawing boards and the horizontal tops of desks. An external light shall be provided over the entrance to the building shielded to prevent misleading traffic on the public road.

11. Required Time Duration for Providing and Maintaining Accommodation and Equipment

Period 1: Period 1 means

The Principal Offices including their contents, access roads and hard-standings thereto shall be available for occupation within 4 weeks of the Date of Commencement of Works notified by the Engineer in accordance with Clause 41 of the Conditions of Contract and shall be maintained and serviced until 12 weeks after the issue of the Certificate of Completion pursuant to Clause 48 of the Conditions of Contract in respect of the Whole of the Works as referred to in Sub Clause 48(3), or until completion of any outstanding works, whichever is the latest.

Period 2: Period 2 means

The reduced office accommodation including contents applicable to the rooms defined, access road and hard-standings shall be maintained and serviced from the expiry of the Period 1 until 24 weeks after the issue of the Certificate of Completion for the Whole of the Works as specified in the Form of Tender.

APPENDIX 1/2: VEHICLES FOR OVERSEEING ORGANISATION
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The following specification fulfils the vehicle requirements for the Works.

Vehicles shall be new, of a light colour, approved by the Engineer in accordance with Section O5.2 of Part 2 of Chapter 8 of the Traffic Signs Manual and be free from markings identifying any company associated with the Contract. If the vehicle is not a conspicuous colour a minimum 50 mm wide high visibility fluorescent yellow retroreflective tape shall be applied along each side of the vehicle.

The vehicles shall be equipped with high visibility rear markings. High visibility rear markings should comprise of chevron markings comprising alternate strips of fluorescent orange-red retroreflective material and fluorescent yellow non-retroreflective material, of not less than 150mm width each, inclined at 45-60° to the horizontal and pointing upwards. The markings should cover as much of the rear-facing portion of the vehicle as possible without obscuring windows, vehicle lighting or registration plates. Retroreflective tape shall be placed on the rear facing edges of doors that are opened.

The vehicles shall be equipped with fire extinguisher, first aid kit, sign board reading 'Highway Maintenance' in accordance with Diagram 7404 of Schedule 13, Part 6 of the Traffic Signs Regulations and General Directions 2016 (The lettering shall be the largest x height that can be accommodated out of the following heights: 37.5, 50, 62.5, 75 or 100mm) and one or more suitable roof mounted amber flashing distinctive lamps fitted in accordance with Section O5.3 of Part 2 of Chapter 8 of the Traffic Signs Manual and The Road Vehicle Lighting Regulations.

Vehicle Types A to B shall be provided for the exclusive use of the Engineer at all times. One Type C vehicle shall be provided for the exclusive use of the Employer at all times. The Contractor shall indemnify the Overseeing Organisation, the Engineer, his representatives and their respective staffs authorised to drive the vehicles against claims in respect of damage to vehicles including claims from passengers. The vehicles shall be cleaned inside and outside once per week by the Contractor. An equivalent vehicle shall be provided whilst any vehicle undergoes servicing or repair.

Unless agreed otherwise with the Overseeing Organisation vehicles shall be hybrid or electric. If vehicles require charging points then one charging point per vehicle shall be provided as part of the parking requirements for the Overseeing Organisation in accordance with Section 1.1 of Appendix 1/1. The Contractor shall bear the costs of fuel and/or electricity associated with the Overseeing Organisation vehicles.

Anticipated mileage is 1500 miles/week/vehicle.

The following vehicles of EC manufacture shall be provided:

TYPE	VEHICLE	NUMBER REQUIRED	PERIOD REQUIRED
A	Short wheelbase vehicle suitable for off-road use with 4 wheel drive, hard top and sides (Mitsubishi Outlander PHEV or similar).	4	From Commencement to Date of Completion for the Whole of the Works plus 12 weeks
B	2/4 door estate / hatchback (Nissan Leaf or similar)	3	From Commencement to Date of Completion for the Whole of the Works plus 12 weeks
C	Short wheelbase vehicle suitable for off-road use with 4 wheel drive, hard top and sides (Mitsubishi Outlander PHEV or similar).	1	From Commencement to Date of Completion for the Whole of the Works plus 12 weeks

APPENDIX 1/2: VEHICLES FOR OVERSEEING ORGANISATION (Continued)
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In addition to the above, vehicles of type A & C above shall be fitted with heavy duty suspension, tyres suitable for off-road use (from 01 October to 15 May vehicle tyres are to be changed for winter – 3PMSF certified versions), spare wheel, fuel filler cap lock, bonnet lock and spare wheel lock, internal and external mirrors, mud flaps, link mats front and rear (where applicable), mudshields for front and rear brakes, rubbers pads for clutch and brake pedals, interior sun visors, gearbox covers, tow rope, towing hooks front and rear, laminated windscreen, wire mesh guards for side, tail and flasher lamps, covers for universal joints/hernbolts and sumpguards and 2 number fitted rear seats to vehicle Types A & C.

APPENDIX 1/3: RADIO COMMUNICATION SYSTEM FOR THE OVERSEEING ORGANISATION

The following specification fulfils the communication system requirements for the Works.

13 No. mobile smartphones (minimum internal memory 16GB) with colour screen and the capacity to record and send minimum 13MP photographic images, capable of reception at all parts of the site.

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Notes:

1. Unless otherwise stated below, all sampling and testing in this Appendix shall be undertaken by the Contractor.
2. Tests comparable to those specified in this Appendix will be necessary for any equivalent work, goods or materials proposed by the Contractor (See sub-clause 105.4)
3. (N) indicates that a United Kingdom Accreditation Service (UKAS) or European Co-operation for Accreditation of Laboratories (EAL) accredited laboratory sampling and test report or certificate is required.
4. Unless otherwise shown in this Appendix, tests for work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
5. Cube strengths are not required for concrete complying with Clause 2602.
6. Unless otherwise shown in this Appendix, test certificates for work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
7. The Contractor's attention is drawn to the Employer's Requirements for additional testing requirements.

The Contractor shall incorporate in the schedule of tests required under Clause 36 of the Conditions of Contract as a minimum the tests detailed in the following table together with all additional tests required by the Contract.

8. All samples and cores taken for testing in accordance with Series 900 of the Specification shall be photographed against a suitable base scale to the approval of the Overseeing Organisation.

The photographs, together with corresponding RRS1 and CRS1 Forms included in Clause 952AR of Appendix 0/1, shall be delivered to the Overseeing Organisation within seven days of the sampling on site.

9. All reference to FWD within this Appendix shall mean Falling Weight Deflectometer as described in HD29 of the DMRB.

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 100					
109	Noise Control	L _{Aeq}	As required in Appendix 1/9		Standard as per Appendix 1/9
	Vibration Control	Peak particle velocity	As required in Appendix 1/9		Standard as per Appendix 1/9

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 300					
306	Permanent fencing				Quality management scheme applies
	Concrete components	Cover to reinforcement	1 per consignment (maximum 1 per 100 components) (BS 1722)		
308	Gates and stiles				Quality management scheme applies
	Reinforced concrete posts	Cover to reinforcement	1 per consignment (maximum 1 per 100 components) (BS 3470)		
308 and 311	Preservation of timber	Full sapwood penetration	As required in sub-Clause 311.2(v)	Required for each batch	Quality management scheme applies

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 400					
402	Welding	Welding procedures (Manufacturer's tests)	(Every seven years)	Required	Quality management scheme applies
		Welder qualification (Manufacturer's tests)	As required in sub-Clause 402.6 (iii)		
		Production testing (Manufacturer's tests)	As required in sub-Clause 402.6(iv)		
	Welded joints	Destructive testing	As required in sub-Clause 402.6(v) and (vi)		
403	Anchorage and attachment systems for use in drilled holes.	Ultimate tensile load (Manufacturer's tests).		Required	To provide well attested and documented evidence.
404	Anchorage in drilled holes	On-site tensile load test	As required in Appendix 4/1	Required	
	Post foundations				
406	Vehicle Parapets.			Required (BS6779-1 1998 (And No 14290, 21 March 2003)	Quality Management Scheme applies
407	Anchorage and attachment systems for use in drilled holes	Ultimate tensile load (Manufacturers test)		Required	To provide well attested and documented evidence
409	Vehicle parapet posts	Production testing as specified BS6779-1 1998 And No 14290 21 March 2003 (Manufacturers tests)		Required	Certification in accordance with Clause 409 is required
410	Anchorage in drilled holes	On site tensile load test	As required in Appendix 4/1	Required	

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 500						
501	Pipes for drainage and service ducts	Vitrified clay			Product certification scheme applies	
		Concrete - PC/SRC	not exceeding 900mm diameter	(See Note 2)		
		Concrete - Pre-stressed				
		Iron - cast				
		Iron - ductile		(See Note 2)		
		PVC-U				
		GRP				
		Plastics. See Table 5/1				
		Corrugated steel	(Manufacturer's tests)			Required (AASHTO)
		Corrugated steel bitumen protection				
	Other materials			Required	BBA certification (or equivalent) applies	
503	Pipe bedding	Grading and fines content	1 per week (min of 3)	Required		
		Water-soluble sulfate (WS) content (N)	5 per source			
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)				
		Resistance to fragmentation (N)	1 per source			

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500 (continued)					
505	Filter medium backfill	Plastic index (N)	1 per source	Required	
		Resistance to fragmentation (N)	1 per source		
		Water-soluble sulfate (WS) content (N)	5 per source		
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	5 per source		
		Grading and fines content	1 per week		
		Permeability (N)	1 per source		
506	Sealing existing drains				
	Concrete				
	Grout				
507	Chambers				Product certification scheme applies
	Precast concrete				
	Corrugated galvanized steel	(Manufacturer's tests)		Required	Product certification scheme applies
	Manhole steps				
	Steel fitments				
	Covers, grates and frames				Product certification scheme applies
508	Gullies and pipe junction				Product certification scheme applies
	Precast concrete				
	Clay				
	Cast iron and steel				
509	Watertightness of joints	Air test	All pipelines with watertight joints	Required	
512	Backfill to pipe bays	Grading	1 per 50 tonnes (min of 3)	Required	Minimum to allow for natural variability of sulfur compounds
		Water-soluble sulfate (WS) content (N)	5 per source		
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	5 per source		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 500 (continued)						
513	Permeable backing to earth retaining structures	Plastic index (N)	1 per source	Required		
		Water-soluble sulfate (WS) content (N)	5 per source	Required		
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	5 per source			
		Resistance to fragmentation (N)	1 per source			
		Grading	1 per 200 tonnes (min of 3)			
		Permeability (N)	1 per source			
	Precast hollow concrete blocks	(Manufacturer's tests)		Required		
514	Fin Drains	(Manufacturer's tests)		Required	BBA certification (or equivalent) applies	
515	Narrow filter drains					
		Geotextile, pipes and fittings	(Manufacturer's tests)		Required	BBA certification (or equivalent) applies
		Granular fill	Plastic index (N)	1 per source		
			Resistance to fragmentation (N)			
			Water-soluble sulfate (WS) content (N)	5 per source		
			Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	5 per source		
			Grading and fines content	1 per week (min of 3)		
Permeability (N)	1 per source					
516	Combined drainage and kerb systems	Load test	A minimum of 1 test and not less than 1 test per 1000 metres for each type and source	Required	Certification that the systems comply with Clause 516 is required	
517	Linear Drainage Systems	Load Test	A minimum of 1 test and not less than 1 test per 1000 metres for each type and source	Required	Certification that the systems comply with Clause 517 is required	
518	Thermoplastics structured wall pipes and fittings	(Manufacturer's tests)		Required	BBA certification (or equivalent) applies	

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 600						
601, 631 to 637, 640	Acceptable material				Required	[For recycled aggregate see sub-Clauses 601.12 and 601.18]
	Class	General Description				
	1	General granular fill	Grading/ uniformity coefficient	Twice a week		
			mc/MCV (N)	2 per 1000 m ³ up to max of 5 per day		
		1C only	Resistance to fragmentation (N)	Weekly		[LA category]
	2	General cohesive fill	Grading	Twice a week	Required	Cross reference should be made to any requirements in Appendix 6/1.
			mc/MCV/PL Undrained shear strength (N)	2 per 1000 m ³ up to max of 5 per day		
			Bulk density (pfa) (N)	2 per 1000 m ³ up to max of 5 per day		
	4	Landscape fill	Grading/mc/MCV (N)	Daily	Required	
	5	Topsoil	Testing for characteristics in accordance with BS 3882:2015, Table 1	Daily		
	6	Selected granular fill	Grading/uniformity coefficient	1 per 400 tonnes		
			PI/LL (N)	Daily		
Resistance to fragmentation (N)			Weekly for on-site material			
SMC (N)			Weekly			
		omc/mc, mc/MCV (N)	1 per 400 tonnes		[Not for Class 6F4 and 6F5]	

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 600 (continued)						
601, 631 to 637, 640 (cont'd)	6 (cont'd)	Selected Granular fill (cont'd)	Organic matter/water soluble (WS) sulfate content (N)	Weekly	Required	[At least 5 tests per source sulfur compounds over the course of the contract in accordance with TRL Report 447, tests 1-5]
			Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	Weekly		
			pH/chloride ion content (N)	Weekly		
			Resistivity (N)	As required		
			Undrained and drained shear parameters (N)	As required		
	6F4 and 6F5		Size designation and overall grading category	1 per week	Required	[Results of routine control tests from the factory production control system operated by the producer to be provided for Class 6F4 and Class 6F5 – see Annex C of BSI BS EN 13242 + A1 and Annex C of BS EN 13285]
			Maximum fines and oversize categories	1 per week		
			Volume stability of blast furnace slag	6 monthly		
			Volume stability of steel (BOF and EAF) slag	6 monthly		
			Other aggregate requirements	Annex C of BSI BS EN 13242 + A1		
			Volume stability of blast furnace slag	1 per week		
			Volume stability of steel (BOF and EDF) slag Other aggregate requirements	1 per week Annex C of BSI BS EN 13242 + A1		
			Laboratory dry density and optimum water content	As required		
			Water content	As required		
7	Selected cohesive fill	Grading/mc/ MCV/bulk density (N)	1 per 400 tonnes	Required		
		PI/LL (N)	Daily			
		Organic matter water soluble (WS) sulfate content (N)	Twice a week or daily when sulfates are expected			[At least 5 tests per source for sulfur compounds over the course of the contract in accordance with TRL Report 447, tests 1-5]

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments		
Series 600 (continued)							
601, 631 to 637, 640 (cont'd)	7 (cont'd)	Selected cohesive fill (cont'd)	Oxidisable sulfides (OS) and total potential sulfate (TPS) content (N)	Twice a week or daily when sulfides are expected	Required	[At least 5 tests per source for sulfur compounds over the course of the course of the contract]	
			pH/chloride ion content (N)	Weekly			
			Resistivity (N)	As required			
			Undrained and drained shear parameters (N)	As required		[Cross reference should be made to any requirements in Appendix 6/1].	
			Permeability (N)	As required			
	8	Miscellaneous fill	mc/MCV (N)	Daily			
	9	Stabilised materials	Pulverisation	1 per lane width per 200 metre length			
			mc/MCV (N)				
			Bearing ratio (N)				
	Pulverised fuel ash		Chemical analysis	1 per consignment			[As appropriate to properties stated in Appendix 6/1]
	Furnace bottom ash		Grading	1 per 300 tonnes			
	Fill adjacent to cementitious material or metallic items		Water-soluble sulphate sulfate (WS) content, oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	1 per 400 tonnes or per location if less than 400 tonnes			[At least 5 tests per source for sulfur compounds over the course of the contract in accordance with TRL Report 447, tests 1-5]
602	Earthworks material beneath surface of a road or paved central reserve		Frost heave (N)		Required		
	(i) Off site source			1 every four months			
	(ii) On Site source			1 per source			
609, 621	Geotextiles		Tensile load	1 per 400 square metres	Required		
			Permeability				
			Pore size				

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 600 (continued)						
612	Compaction of fills			Required		
		Method compaction	Field dry density (N)			As required
		End product compaction	Optimum mc (2.5kg rammer/vibrating hammer method) (N)			Each class or sub class of material
			Field dry density (N)			1 per 400 tonnes
614	Cement stabilisation to form capping	Rate of spread of cement	1 per 500 square metres of cement spread	Required		
615 641 643	Lime stabilisation to form capping	Rate of spread of lime	1 per 500 square metres of lime spread	Required		
		Available lime content	Each source of lime weekly during stabilisation operation			
622 638 639	Earthworks for reinforced soil and anchored earth structures	Redox potential	5 locations within the affected area	Required		
		Drainage layers	Grading			1 per 400 tonnes
			Chemical analysis			
		Reinforcing elements	Coeff. of friction			Each type of element with each type of fill
Anchor elements	Adhesion					
624	Ground anchorages	Proof loading	As required in Appendix 6/10	Required		
626	Gabions			Required		
		Fill	Grading			1 per 400 tonnes
			10% fine values (N)			
		Geomesh	[As appropriate to properties stated in Appendix 6/10]	1 per 400 square metres		
PVC coated wire			Required (ASTM G23)			
631	Subgrade	Falling Weight Deflectometer Testing (FWD) augmented by independently verified dynamic Plate Bearing Tests	FWD testing at 25m centres per lane. Dynamic Plate Bearing Tests typically at 100m centres per lane.	Required	Subgrade Stiffness	
	Capping or Stabilised Materials	Falling Weight Deflectometer Testing (FWD) augmented by independently verified dynamic Plate Bearing Tests	FWD testing at 10m centres per lane. Dynamic Plate Bearing Tests typically at 50m centres per lane.	Required	Stiffness Modulus	
642	Earthworks materials for corrugated steel buried structures	Constrained soil modulus (M*)	3 on each side of each structure	Required		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 700					
710	Constituent materials in recycled aggregate	Quality control	Checks are to be carried out by the Contractor in accordance with the procedure set down in 'Quality Control – Production of Recycled Aggregates' and with those in this Clause	Required	The quality control procedure should be in accordance with the 'Quality Control – Production of Recycled Aggregates' published by Waste and Resources Action Programme is available from WRAP website, http://www.wrap.org.uk The results of all quality control checks shall be delivered promptly to the Scottish Ministers on request
711	Overbanding and inlaid crack sealing systems			Required	BBA certification (or equivalent) applies

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 800					
801, 803, 804, 805, 806	General requirements for unbound mixtures adjacent to cement bound materials, concrete pavements, structures or products	Water-soluble sulfate (WS) content (N)	1 per 400 tonnes or per location if less than 400 tonnes	Required	
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	1 per 400 tonnes or per location if less than 400 tonnes		
	Unbound mixtures beneath surface of a road or paved central reserve	Frost heave (N)	1 per source		
		Grading and fines content	1 per week		
		Plastic index (N)			
		Resistance to fragmentation (N)	6 monthly		
		Resistance to wear micro-Deval test			
		Resistance to freezing and thawing (magnesium sulfate soundness) (N)	1 per source		
		Water absorption (N)	As required		
		Volume stability of blast furnace slags	6 monthly		
		Volume stability of steel (BOF and EAF) slags	6 monthly		
		CBR (N)	1 per source and then monthly		
		OMC/mc (N)	As required		
		Density (N)	As required		
		Water absorption (N)	As required		
	Falling Weight Deflectometer Testing (FWD) augmented by independently verified dynamic Plate Bearing Tests.	FWD testing at 10metre centres per lane. Dynamic Plate Bearing Tests typically at 50metre centres per lane.	Stiffness Modulus		
821, 822, 823, 830, 831, 832, 834, 835, 840	Cement and other Hydraulically Bound Mixtures (HBM)	Tests for control and checking of HBM	Test specified in Table 8/14 and Table 8/15	Required	
		Coefficient of linear expansion	As required		
		Tests for laboratory mixture design	Test specified in Clause 880		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 900						
901, 925, 937, 938, 943	Aggregates for bituminous material			Required	National quality management scheme applies	
		Resistance to fragmentation (hardness)	Resistance to fragmentation (N)	Monthly		
		Resistance to freezing and thawing (durability)	Soundness (N)	1 per source		
			Water absorption (N)	As required		
		Cleanness	Sieve test (mass passing 0.063mm sieve) (N)	Monthly		Washing and sieving method to be used
		Shape	Flakiness index (N)	Monthly		
		Blast furnace slag	Bulk density (N)	1 per 500 tonnes		[BS EN 1097-3]
			Soundness (N)	Once every 4 months		
			Dicalcium silicate disintegration (N)	1 per 500 tonnes		
			Iron disintegration (N)			
		Steel slag	Bulk density (N)	1 per 500 tonnes		
			Volume stability (N)	1 per 500 tonnes		
		Coarse aggregate for surface courses	Resistance to polishing (PSV) (N)	1 per source		
			Resistance to surface abrasion (AAV) (N)	1 per source		
		Binders for bituminous materials	Penetration (N)	1 per 750 tonnes		Required
Softening part (N)	1 per 750 tonnes					
903 to 907, 909 to 912, 914, 916, 925, 926, 929, 930, 937, 938, 941, 943, 946 to 948	Bituminous mixtures	Grading (N)	For Audit Test purpose only		National quality management sector schemes apply	
		Binder Content (N)				

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 900 (continued)						
929	Base and Binder Course Asphalt Concrete (Design Mixtures)Base and Binder Course Macadams	Permanent Works - In situ air void content (N)	<i>As required</i>	Required		
		Permanent Works - Refusal air void content (N) Refusal air void content (N) (PRD Test)				
		Permanent Works - Deformation resistance Binder volume (N)				
		Deformation resistance (design)Grading (N)	<i>(As required)</i>	Required		The test certificate CE Mark for the mixture
		Stiffness (design)Binder content (N)				
930	EME 2	Permanent Works - In situ air void content (N)	<i>(As required)</i>	Required		
		Richness modulus (design)	<i>(As required)</i>	Required		The test certificate is the CE Mark for the mixture
		Duriez (design)				
		Deformation Resistance (design)				
		Stiffness (design)				
911	Hot Rolled Asphalt surface course (Design Mixtures)Rolled asphalt surface course (design mix)	Design Binder content. Stability value(N) Flow value (N) Density (N)	1 per source	Required	The test certificate is the CE Mark for the mixture. National quality management sector scheme applies	
915	Coated chippings for application to Hot Rolled Asphalt Surfacing	Hot sand test. Grading (N)	1 per source 1 per stockpile	Required	National Highway Sector Schemes apply Not required for coated chippings for surface dressing to Clause 919	
		Rate of spread (N)Binder content (N)	<i>As required</i> 1 per stockpile			
921	Surface macrotexture	Volumetric Patch (N)BS EN 13036-1 Volumetric Patch Technique (N)	<i>(As required)</i> BS EN 13036-1	Required		
924	High Friction Surfaces	Quality control checks	As required in sub-Clause 924.5As required in sub-Clause 924.5	Required	BBA HAPAS Roads and Bridges certification (or equivalent) applies	
		System coverage				
	Aggregate	Resistance to polishing (PSV) (N)	1 per source* and as required for coated chippings in sub-Clause 915.21 per source and as required for coated chippings in Clause 915.3	Required		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900 (continued)					
937	Stone mastic asphalt (SMA) binder course and regulating course	Permanent Works - In situ air void content (N)	<i>(As required)</i> In accordance with BS 594987	Required	National quality management sector scheme applies
		Permanent Works - Deformation resistance. Binder drainage test			
		Binder drainage test (design)	<i>(As required)</i>	Required	The test certificate is the CE Mark for the mixture
		Deformation resistance (design)			
Scottish Surface Course Specification TS2010	Thin surface course system, TS2010	General properties	In accordance with TS2010 Surface Course specification & Guidance Issue 03 (October 2015) and BS EN 13108- 21	Required	Approval certificate required National quality management sector scheme applies.
943	Hot Rolled Asphalt surface course and binder course (performance related design mixtures)	Permanent Works - In situ air void content (N)	<i>(As required)</i>	Required	National quality management sector scheme applies
		Permanent Works - Deformation resistance. Grading (N)			
		Deformation resistance (design). Binder content (N)	<i>(As required)</i>		The test certificate is the CE Mark for the mixture
944	Performance-specified base				National quality management sector scheme applies

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments		
Series 900 (continued)							
918	Slurry surfacing incorporating microsurfacing	Binder				Modified binders should have a BBA HAPAS Roads and Bridges Certificate. In the event that no such Certificates have been issued, then in the interim, only modified binders undergoing BBA assessment should be considered for approval by the Overseeing Organisation, Scottish Ministers.	
			Product identification	Per product per source	Required		Tests are expected to be repeated every two years
			Vialit cohesion	Per product per source	Required		Tests are expected to be repeated every two years
			Rate of spread	For each machine	Required		Not more than 6 weeks prior to start of work
			Penetration at 25°C and 5°C (N)	Every manufactured batch			Manufacturer's QA test results may be submitted
		Aggregates	Flakiness index (N)	1 per source	Required	<i>(Less than 6 months prior to work)</i>	
			Resistance to polishing (PSVAAVPSV) (N)	Source approval	Required	<i>(Less than 6 months prior to work)</i>	
			Resistance to surface abrasion (AAV) (N)	Source approval	Required	<i>(Less than 6 months prior to work)</i>	
			Grading (N)	1 per 200 tonnes	Required		
		System	TAIT or BBA/HAPAS		Required		
		920	Bond coats, tack coats and other bituminous sprays	Binder	Product identification	1 per product per source	Required
Vialit cohesion	1 per product per source				Required	Tests are expected to be repeated every two years	
Accuracy of spread	1 for each binder and sprayer per month				Required	Not more than 6 weeks prior to start of work and one per month	
Rate of spread	1 per week						
Penetration at 25°C and 5°C (N)	Every manufactured batch					Manufacturer's QA test results may be submitted	

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900 (continued)					
919 922	Surface Dressing				National quality management sector scheme applies
		Binder			
	Product identification		1 per product per source	Required	Tests are expected to be repeated every two years
	Vialit cohesion (N)		1 per product per source	Required	Tests are expected to be repeated every two years
	Accuracy of spread		1 for each binder and spray per week	Required	Not more than 6 weeks prior to start of work and one per week
	Rate of spread		Every 1000 linear metres initially	Required	Frequency to be reduced to daily after 3 satisfactory results, but not less than 1 test per site
	Penetration at 25°C and 5°C (N)		Every batch		For cut back binders as supplied, manufacturer's QA viscosity test results may be submitted
	Chippings	Resistance to (PSV) polishing (N)	Source approval	Required	Less than 6 months prior to work
		Resistance to abrasion (AAV) (N)	Source approval	Required	Less than 6 months prior to work
		Grading (N)	1 per 200 tonnes	Required	
		Binder content (N)	1 per 200 tonnes	Required	Coated chippings only
		Flakiness index (N)	1 per 200 tonnes	Required	
		Accuracy of spread (N)	1 for each chipping spreader for every change of chipping size or source	Required	Initial test not more than 6 weeks prior to start of work
		Rate of spread	Every 500 linear metres initially		Frequency to be reduced to daily after 3 satisfactory results, but not less than 1 test per site
	System	TAIT or BBA/HAPAS		Required	
	Rollers	Spray bars working	Before work starts and daily during works		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900 (continued)					
950	Depressions				BBA HAPAS Roads and Bridges Certification (or equivalent) applies.

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1000					
1001 1030	Cement			Required	Quality management and product certification schemes apply
1044	Portland cement CEM I				Tests and test certificates are required
	Portland blastfurnace cement				
	Blastfurnace cement CEM III/A				
	Portland PFA cement CEM II/B-V				
	Pozzolanic cement CEM IV/A			Required (BS6610)	
	Portland cement with microsilica			Required	BBA Roads and Bridges Certificate required for microsilica
	Pulverised - fuel ash				Tests and test certificates are required. Product certification schemes apply to pfa and slag.
	Ground granulated blast furnace slag				
	Admixtures				
	Mixing water	Sulfate content (N)	Monthly		
Aggregates		Resistance to freezing and thawing - magnesium sulfate soundness (N)	1 per source	Required	
		Water absorption (N)	As required		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 1000 (continued)						
1001 1030 1044 (cont'd)		Flakiness index (N)	Monthly	Required		
		Shell content (N)	1 per source			
		Resistance to fragmentation (N)	6 monthly			
		Resistance to polishing (PSV) (N)	1 per source			
		Resistance to abrasion (AAV) (N)	1 per source			
		Grading and fines content (N)	1 per week as per source			
		Chloride content (N)	Weekly or as otherwise agreed (1 per source for CBM Aggregate)			
		Total sulfur (TS) and acid-soluble sulfate (AS) content (N)	Every 6 months			
	Flint coarse aggregate containing white flints	Water absorption (N)	3 per source thereafter weekly	Required		
	Sand (i.e. Fine aggregate)	Acid-soluble material (N)	Monthly			Not required for CBM aggregate
	Blastfurnace slag	Bulk density (N)	Every 6 months			
		Dicalcium silicate disintegration (N)	Every 6 months			
		Iron disintegration (N)	Every 6 months			
		Total sulfur (TS) and acid-soluble sulfate (AS) content (N)	Every 6 months			
Pulverised-fuel ash			Required (BS3892: Part 2)			

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 1000 (continued)						
1002 1003 1004 1044	Pavement Concrete	Air content test (N)	As required in Table 10/10	Required	Product certification scheme applies	
		Density (N)	As required in Table 10/10			
		Strength (N)	As required in Table 10/10			
1005	Consistence (Workability)	Degree of Compact-ability (Compaction Index) (N)	As required in Table 10/10	Required		
		Vebe (N)				
		Slump (N)				
1011 1012	Dowel bars Tie bars			Required (BS 4449+A3)	Product certification scheme applies	
		Dowel bars and supporting cradles	Load test			1 per arrangement
		Sheathed dowel bars	Bond stress			4 bars
		Cranked tie bars (coated)	Bend test			4 bars
			Salt fog cabinet			4 bars
1015	Joint filler board	Weathering test	3 per source	Required	Normally undertaken by manufacturer	
		Compression and recovery	4 per source			
		Extrusion	1 per source			
		Cork filler board	Immersion in water			2 per source
			Immersion in acid			2 per source
1016 1017	Applied sealants	Initial Penetration	1 per 1000 m or 1 per day	Required (BS EN14188-1, BS 2499-2, BS5212-1, BS5212-2) (BSEN13880-2, BSEN13880-3 and BS4254)		
		Resilience	1 per 1000 m or 1 per day			

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1000 (continued)					
1016 1017 (cont'd)	Compression seals			Required (ASTM D2628) (BS2752) (BS4443:Part 4) Method 10 and (BS EN ISO 2440) (BS EN ISO 1856) (BS903: Part A16 or BS ISO 1817)	
		Compression set	1 per type of seal		
	Immersion in oil	1 per type of seal			
	Self expanding cork seal	Tests specified in Clause 1017	1 per type of seal	Required	
1026 1044	Surface macrotexture	BS EN 13036 - 1 Volumetric Patch Technique (N)	1 per day (set of 10)	Required	
1027	Aluminised curing compound	Efficiency index	1 per source	Required	
1030	Wet lean concrete	Density	As required in Table 10/9	Required	
		Cube strength (N)			
1043	Foamed Concrete	Cube strength (N)	2 cubes per 12m ³	Required	

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1100					
1101	Precast concrete kerbs, channels, edgings and quadrants	Bending Strength	Minimum of 8 per 1000 units of each product (BS EN 1340)	Required	
1102	In situ asphalt kerbs	Grading	1 test per 500 metres laid	Required	
		Binder content			
1104	Precast concrete flags		Minimum of 8 per 1000 m ² of each product (BS EN 1339)	Required	
	Bedding	Granular material			
		Mortar			
1107	Concrete block paving	Compressive strength	Minimum of 8 per 1000 m ² of each product (BS EN 1338)	Required	
1108	Clay pavers	Bending strength	Minimum of 8 per 1000 m ² of each product (BS EN 1344)	Required	
		Skid resistance	Minimum of 8 per 1000 m ² of each product (BS EN 1344)		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1200					
1202	Permanent traffic signs			Required	Quality management scheme applies. Certification that the traffic sign is capable of passing the tests in BS 873: Part 1 is required
1207	Anchorage in drilled holes to supports of traffic signs	Loading test on site			
1210	Holding down bolts and anchorages to bases of permanent bollards			Required	Certification that the holding down bolts and anchorages are capable of complying with the performance requirements of BS873: Part 3 is required
1212	Road Markings	Tests specified in BS EN 1824		Required	National quality management sector scheme applies. Procedures are given in BS EN 1824
	Glass Beads	Arsenic trioxide content, lead content and Antimony content (N)	One per contract and for specific source of supply	Required	
1214	Permanent traffic cones and traffic cylinders			Required	Certification that permanent traffic cones and cylinders have been tested and comply with BS EN 13422 is required
		Test specified in BS EN 13422	2 of each size and category / type		
	Flat traffic delineators			Required	Certification that the FTD's have been tested and comply with Clause 1214 is required
		Test specified in Clause 1214	As required		
	Other traffic delineators			Required	Certification that the delineators have been tested and comply with Clause 1214 is required
		Test specified in Appendix 12/4	As required		
Temporary cones, cylinders, FTD's and other delineators			Required	Certification that at least 1 in 500 of any batch of cones, cylinders, FTD's and other delineators to be used in the Temporary Works have passed the tests in Clause 1214 as appropriate is required	

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 1200 (continued)						
1217	Traffic signals				Quality management scheme applies. Statutory type approval of equipment applies	
	Cables				Product certification scheme applies	
	Controllers <i>[Other equipment]</i>	Test specified in Appendix 12/5	Each controller before delivery to Site and again after installation			
	Cabling	Tests a, b, c, e, f, g, h, j as defined in sub-Clause 1424.2	Each traffic signals installation	Required	Certification that the installation complies with BS 7671 (the IEE Wiring Regulations) is required	
1218	Detector loops					
	Cable			Required	Certification that completed cables comply with specification TR 2029 is required	
	Epoxy resin			Required	Certification that the epoxy resin complies with specification MCH 1540 is required	
	Feeder cable			Required	Certification that completed cables comply with specification TR 2031 is required.	
	Joints	Pull test (4 kgf)	Each crimp			
	Installation	Series resistance		Each loop	Required	Certification in accordance with specification MCH 1540 is required
		Insulation resistance				
	Inductance					

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 1300						
1305	Anchorage for use in drilled holes	Tensile load (Manufacturer's tests)		Required	To provide well attested and documented evidence	
1306	Anchorage in drilled holes to columns and masts with flange plates	Loading test on site	As required			
1310	Welding	Welding procedures (Manufacturer's tests)	(Every seven years)		Quality management scheme applies	
		Welder qualification (Manufacturer's tests)	(Sub-clauses 1310.1 and 1310.2 (7.1.3.))		Quality management scheme applies	
		Production testing (Manufacturer's tests)	(Sub-Clauses 1310.1 and 1310.2 (7.1.4))			
	Welded joints	Destructive testing (Sub-Clause 1310.1 and 1310.2 (7.1.5))				
1313	GFRP laminates	Loss of ignition	1 per 50 production columns			
		Colour fastness	1 per batch			
		Electric strength				
		Water absorption				
		Impact strength				
1314	Brackets for laminated GFRP lighting columns			Required		
		Polyurethane foam	Bulk density			1 per batch
			Surface hardness			
			Apparent bulk density			2 per batch
			Impact strength			
			Flexural stress			

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1400					
1421	Cable				Product certification scheme applies
1424	Lighting Units	Tests specified in Clause 1424	Each unit	Required	Product certification scheme applies Certification that the installation complies with BS7671 (the IEE Wiring Regulations) is required.
	Networks	Test specified in Clause 1424	Each network	Required	Certification that the installation complies with BS 7671 (the IEE Wiring Regulations) is required

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1500					
1506	Copper communications cable			Required	Certification that each completed cable complies with specification TR2150 or TR 2158, as appropriate, is required
	Optical fibre communications cable			Required	Certification that each completed cable complies with specification TR2151 or TR 2159, as appropriate, is required
	Coaxial communications cable				Certification that each completed cable complies with specification TR2152 or TR 2160, as appropriate, is required
	Energy cable			Required	Certification that each completed cable complies with specification TR2153 or TR 2161, as appropriate, is required
1513	Cable joint enclosures	Test specified in Clause 1513.12	Each CJE	Required	Certification that CJE satisfies the air pressure test is required
1518	Coaxial and copper Communications and power cable	Tests specified in specification MCG 1022 or MCG 1099, as appropriate	Each cable (Stage 1) As required in Appendix 15/1 (Stage 2)		Results to be reported in accordance with MCG 1022 or MCG 1099, as appropriate
	Optical fibre communications cable	Tests specified in specification MCG 1055 or MCG 1099, as appropriate	Each cable (Stage 1) As required in Appendix 15/1 (Stage 2)		Results to be reported in accordance with MCG 1055 or MCG 1099, as appropriate
1522	Motorwarn System				
	Steel posts			Required (BS 6323)	
1526	Electrical installations	Tests specified in BS 7671	Each installation	Required	Certification that the installation complies with BS7671 (the IEE Wiring Regulations) is required
1530	Cable ducts	Tests specified in BS EN 50086-1, 2 and 4	Each supplier	Required	Current British Board of Agrément Certificate is required

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1500 (continued)					
1533	Cable ducts				
	Mandrel test	Tests specified in Clause 1533	Each duct	Required	Certificate that each length of duct between chambers satisfies the mandrel test is required
	Air test	Tests specified in Clause 1533	Each duct	Required	Certificate that each length of duct between chambers satisfies the air test is required

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1600					
1601	Soil samples In situ soil tests			Required	
1602 to 1606 1610 to 1615	Concrete Grout Reinforcement Prestressing Steelwork Welding Protection against corrosion			Required	
1606	Coatings for protection against corrosion	Adhesion	As required in Appendix 16/6		
1607	Reduction of friction on piles				
1608 1616	Integrity testing Dynamic testing				
1609	Static load testing of piles			Required	
1612	Self hardening slurry mixes			Required	
1617	Instrumentation			Required	
1618	Support fluids	To be proposed by the Contractor			See Appendix 16/18

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments		
Series 1700							
1702 1704	Cement types as stated in sub-Clause 1702.1			Required	Certificate to be provided monthly for each type of cement. Quality management and product certification schemes apply.		
	Cements (all types)	Chloride content	Monthly		Tests to be carried out by the manufacturer and results included on the test certificates required above		
	Pulverised-fuel ash	Sulfate content	Monthly				
	Ground granulated blast furnace slag	Acid-soluble alkali content	Daily (PC) Weekly (pfa ggbs)				
	Aggregates	Grading and fines content			1 per delivery (per source)	Results of routine control tests from the factory production control system operated by the producer to be provided - see Annex H of BS EN 12620 Product certification scheme applies	
		Shell content (N)			Monthly		
		Flakiness index (N)			Monthly		
		Resistance to fragmentation (N)			Monthly		
		Drying shrinkage (N)			1 per 5 years		
		Chloride content (N)			1 per week or as otherwise agreed		
		Sulfate Content (N)			Yearly		
	Blastfurnace slag	Bulk density (N)			Every 6 months		
		Stability (N)			Every 6 months		
		Sulfur content (N)			Every 6 months		
	Water	Tests specified in BS EN 1008			As required		
		Chloride content			Monthly		
		Sulfate content			Monthly		
		Acid-soluble alkali content			Weekly		
	Admixtures	Chloride Content			1 per consignment	Required (BS EN 934-2)	
		Sulfate content			1 per consignment	Required	
		Acid-soluble alkali content			1 per consignment		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work Goods or Material	Test	Frequency of Testing	Test Certificate	Comments			
Series 1700 (continued)								
1707	Hardened concrete – Identity Testing	Cube strength (N) – as described in contract specific Appendix 17/4	Pre stressed concrete two cubes from 12 m ³ or 2 batches whichever represents the lesser volume	Required	Contractor to cast and test sufficient additional cubes to demonstrate cube strength before transfer			
			Reinforced concrete two cubes from 24 m ³ or 4 batches whichever represents the lesser volume					
			Mass concrete - two cubes from 50 m ³ or 50 batches whichever represents the lesser volume					
			Additional cubes for special purposes			Contractor to specify as required.		
		Cube strength - identity testing as described in Appendix 17/4 (N)	2 cubes from each of 2 samples of each batch					
		Density	As required					
		Modus of elasticity						
		Fresh concrete – Identity Testing	Consistence (slump or flow) (N)			Each batch	Required	
			Air content			Each batch		
			Cement content			As required		
Density								
Water/cement ratio								
1710	Concrete packing Mortar packing Epoxy resin bonding agent							
	Precast concrete not conforming to any Product Standard or to BS EN 13369	Cube strength (Manufacturer's tests)			Contractor to make available records of tests by the manufacturer. See sub-Clause 1710.8			

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 1700 (continued)						
1711	Grouting and Duct Systems for Post-tensioned tendons				Product acceptance scheme or equivalent applies.	
		Full scale trials, where required in the Contract	In accordance with BS EN 447 and BS EN 446		See sub-clause 1711.1 and Appendix 17/6	
		Duct assembly verification tests			See sub-clause 1711.4 and Appendix 17/6	
		Fluidity			See sub-clause 1711.2 and sub-clause 1711.3	
		Bleeding				
		Volume change				
		Cube strength				
		Sieve				
		Density				
		Time Setting				
1712	Reinforcement				Product certification scheme or equivalent applies	
	Steel bars					Required (BS 4449+A3)
	Steel wire					Required (BS 4482)
	Steel fabric					Required (BS 4483)
	Stainless Steel					Required (BS 6744)
1713	Fabricated reinforcement			Required	Certification that fabricated reinforcement complies with the routine inspection / testing requirements of BS 8666 is required if the fabrication is not covered by a product certification scheme or equivalent.	
1716	Reinforcement jointing systems	Permanent elongation characteristic strength (Manufacturer's test)		Required for each type of connection	Product acceptance scheme or equivalent applies	
1717	Reinforcement Welding	Welding procedure approval (BSEN ISO 17660)	As required in BS EN ISO 17660		Tests should be carried out by an independent testing body.	
		Welder approval (BS EN ISO 17660)				

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700 (continued)					
1718	Prestressing tendons				Product certification scheme or equivalent applies
	Steel wire and strand			Required (BS5896)	
	Steel bar			Required (BS4486)	
	Prestressing steel (all types)	Proof load Breaking load Elongation Ductility Relaxation Modulus of elasticity	As required		
	Other than lowest strength wires or strand to BS5896	0.1% proof load	Each reel		
1724	Post-tensioning anchorages	Tests in accordance with BS EN 13391 (Manufacturer's tests)		Required (BS EN 13391)	Product certification scheme or equivalent applies
1726	Stainless steel bar			Required (BS6744)	Product certification scheme or equivalent applies
1727	Inspection and testing of structures and components				Contractor to specify as appropriate to requirements of Appendix 17/4.

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1800					
1805	1805.2 Metallic products			Required according to BS EN 1090-2:2008+A1:2011, Table 1	
	1805.3.4 Special properties of constituent products	Testing to identify internal discontinuities or cracks in zones to be welded as specified in Appendix 18/1	As required in Appendix 18/1		
1806	1806.4.4 Check of the capability of cutting processes that are likely to produce local hardness	Testing in accordance with BS EN ISO 6507	As required		
	1806.5.4 d) Check of the hardness and geometry of hollow section components subject to bending by cold forming	Check of the hardness, testing in accordance with BS EN ISO 6507	As required		
1807	1807.4.1.2 Qualification of welding procedures (Processes 111, 114, 12, 13 and 14)	Tests specified in BS EN ISO 15614-1 or BS EN ISO 15613	As required in BS EN ISO 15614-1 or BS EN ISO 15613		Results to be reported in accordance with BS EN ISO 15614-1 or BS EN ISO 15613
	1807.4.1.2 (3) Qualification of welding procedures for joints with restricted access	Tests specified in BS EN ISO 15613	As required in BS EN ISO 15613		Results to be reported in accordance with BS EN ISO 15613
	1807.4.1.3 Qualification of welding procedures for other welding processes	Tests specified in the standards listed in BS EN 1090-2:2008+A1:2011, Table 13	As required in the standards listed in BS EN 1090-2:2008+A1:2011, Table 13		Results to be reported in accordance with the standards listed in BS EN 1090-2:2008+A1:2011, Table 13
	1807.4.1.4 Validity of welding procedure qualification	Additional tests specified in BS EN 1090-2:2008+A1:2011, 7.4.1.4 for a welding procedure qualified in accordance with BS EN ISO 15614-1, which is undertaken by a welding process that has not been used	As required in BS EN 1090-2:2008+A1:2011, 7.4.1.4		Results to be reported in accordance with BS EN ISO 15614-1 Note the requirement in BS EN 1090-2:2008+A1:2011, 7.5.12 relating to stud weld procedure testing.
	1807.4.1.4 (1) Validity of welding procedure qualification	Welding production test in accordance with the qualification standard for the process concerned	As required		Results to be reported in accordance with the qualification standard for the process concerned

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1800 (continued)					
1807 (cont'd)	1807.4.2 Qualification of welders and welding operators	Tests specified in BS EN 287-1 (welders) or BS EN 1418 and BS EN ISO 14732:2013 (welding operators)	As required in BS EN 287-1 or BS EN 1418 and BS EN ISO 14732:2013 as appropriate	Required	Certificate to be in accordance with BS EN 287-1, Annex A or BS EN 1418 and BS EN ISO 14732:2013, Annex C as appropriate
	1807.4.2 Qualification of welders of hollow section branch connection with angles less than 60°	Specific qualification test. Test specified in BS EN 287-1.	As required		
	1807.4.2 (1) Qualification of welders of joints with restricted access	Specific qualification test. Test specified in BS EN 287-1.	As required		
	1807.5.1.1 Verification that joint preparation in steel grades higher than S460 are free from cracks	Testing in accordance with BS EN 571-1 1 and BS EN ISO 3452-1:2013 (penetrant) or BS EN 1290 and BS EN ISO 17638:2016 (Magnetic particle)	As required		
	1807.5.1.1 (1) Qualification of welding procedures where prefabrication primers are to be left on the fusion faces	Tests specified in BS EN ISO 15614-1 or BS EN ISO 15613 using such prefabrication primers	As required in BS EN ISO 15614-1 or BS EN ISO 15613		Results to be reported in accordance with BS EN ISO 15614-1 or BS EN ISO 15613
	1807.5.4 (1) Welding of joints in hollow sections, full penetration butt welds with restricted access	Pre-production weld test conforming to BS EN ISO 15613	As required		
	1807.5.6 (3) Verification of ground surface are free of cracks following removal of temporary welded attachments	Testing in accordance with BS EN 1290 and BS EN ISO 17638:2016 (Magnetic particle)	As required		
	1807.5.9.2 (1) Verification of the absence of surface cracking in continuity welds in permanent steel backing	Testing in accordance with BS EN 571-1 and BS EN ISO 3452-1:2013 (penetrant) or BS EN 1290 and BS EN ISO 17638:2016 (Magnetic particle)	As required		
	1807.5.18 Welding of bridge decks	Production tests in accordance with BS EN 1090-2:2008+A1:2011, 12.4.4 c)	As required		
1808	1808.5.3 (1) k value check for Torque method	Test in accordance with BS EN 1090-2:2008+A1:2011, Annex H	Daily		
	1808.5.4 (2) k value check for the combined method	Test in accordance with BS EN 1090-2:2008+A1:2011, Annex H	Daily		
	1808.5.5 (1) Preload check for HRC method	Test in accordance with BS EN 1090-2:2008+A1:2011, Annex H	Each assembly lot		
	1808.9 Use of special fasteners and fastening methods	Procedure tests for special fasteners and fastening methods as specified in Appendix 18/1	As required in Appendix 18/1		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1800 (continued)					
1810	1810.1 (5) Slip resistant connections	Slip factor test in accordance with BS EN 1090-2:2008+A1:2011, Annex G	As required in Appendix 18/1		
	1810.1 (10) Verification of the preparation carried out before overcoating galvanized components	Test as specified in Appendix 18/1	As required in Appendix 18/1		
1812	1812.2.1 (1) Specific testing of constituent products not covered by standards	Test as specified in Appendix 18/1	As required in Appendix 18/1		
	1812.2.1 (2) Mechanical fasteners	Sample testing as specified in 1812.2.1 (2)	As required in 1812.2.1 (2)		Results to be reported in accordance with 1812.2.1 (2). Testing not required if mechanical fasteners supplied by a NHSS 3 registered Organisation. See 1800.5.2
	1812.2.1 (3) Mechanical fasteners	Suitability testing as specified in 1812.2.1 (3)	As required in 1812.2.1 (3)		Results to be reported in accordance with 1812.2.1 (3).
	1812.4.1 Inspection before and during welding	Non destructive testing methods selected in accordance with BS EN 12062 and BS EN ISO 17635:2016	As required in BS EN 1090-2:2008+A1:2011, 12.4.1		
	1812.4.2.2 Inspection after welding – Scope of inspection	Supplementary non destructive testing determined by the manufacturer	As required in BS EN 1090-2:2008+A1:2011, 12.4.2.2		See 1812.4.2.2 (6)
	1812.4.2.2 (1) Inspection after welding – Specific inspection of welds	Supplementary non destructive testing in accordance with 1812.4.2.2	As required by 1812.4.2.2 (1) to (5)		
	1812.4.3 (1) Welded shear studs	Production tests as specified in BS EN ISO 14555, 14.2	As required in 1812.4.3 (1)		Results to be documented in accordance with 1812.4.3 (4)
	1812.4.3 (2) Welded shear studs	Hammer tests as specified in 1812.4.3 (2)	Every welded shear stud		
	1812.4.3 (3) Welded shear studs	Simplified production tests as specified in BS EN ISO 14555, 14.3	As required in 1812.4.3 (3)		Results to be documented in accordance with 1812.4.3 (4)
	1812.4.4 (1) Production tests on welding	Production tests on welding as specified in 1812.4.4 (1)	As required in 1812.4.4 (1)		Results to be reported in accordance with the relevant standard
	1812.4.4 (2) Production tests on welding using run-off coupon plates	Production tests on run-off coupon plates as specified in 1812.4.4 (2)	As required in 1812.4.4 (2)		
	1812.7.4 Other acceptance tests	Testing requirements for components erected to a specific load as specified in Appendix 18/1	As required in Appendix 18/1		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1900					
1903	Abrasives	Grading	As required		
		Hardness			
1909	Galvanised coatings	Test specified in BS EN ISO 1461	As required		
1911, Table 19/2B	Hot dip galvanised coating to fasteners	Tests specified in BS EN ISO 10684	As required		
1912 1912SE	Paints – 'A' and 'B' samples	Provision of samples for 'A' and 'B' sample tests			Samples selected in accordance with Clause 1912 and 1912SE
	Paints – 'A' and 'B' samples	Specific gravity	As required by rate of 'A' and 'B' sampling		See NG 1912, 3; Appendix 19/4, Note 4; Appendix 19/4SE, Note 4; NG 1912.3NI, 3 and Appendix 19/4NI.
	Paints – 'A' and 'B' samples	Colour match	As required by rate of 'A' and 'B' sampling		See NG 1912,3 and NG 1912NI, 3.
1914	Coating system minimum film thickness	Minimum dry film thickness measurements. In accordance with BS EN ISO 2808, BS3900-C5	Required – representative testing		
	Coating system adhesion	Pull off adhesion test in accordance with ASTM D4541 – Type III	Required – representative testing		
	Coating system defects	Visual assessment supplemented by appropriate testing	Required		
	Coating system defects – pin-holing or porosity	Low or high voltage detectors in accordance with ASTM G62-07	Required – representative testing excluding corners, bolted joints or welds		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2000					
2003	Permitted waterproofing systems				Product Acceptance Scheme or equivalent applies.
	Additional bituminous protection		1 per 15 tonnes		
	Stability value		1 per 15 tonnes		
2004	Tar	Tests specified in BS76	1 per source		Sampling to comply with BS76
	Cut back bitumen		1 per source		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2100					
2101	Bridge bearings	Bearings (other than Elastomeric bearings)	Load testing – serviceability limit state	As required in contract specific Appendix 21/1	
			Load testing – ultimate limit state		
			Other tests specified in contract specific Appendix 21/1		
		Elastomeric bearings	Compressive test	As required in contract specific Appendix 21/1	
			Stiffness test		
			Shear stiffness test		
			Other tests specified in contract specific Appendix 21/1		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2400					
2401	Masonry cement				
2402	Sand				
2403	Water	Tests specified in BS EN 1008	As required		
2404	Mortar admixtures				
2405	Lime				
2406/ 2417	Bricks				
	Clay				
	Calcium silicate				
2407	Concrete				
	Blocks				
	Clay				
2408	Concrete				
	Reconstituted stone				
2410 2411	Stainless steel				
	Wire/fabric				
	Bars				
	Ready mixed mortars				
	Mortars		1 set of tests per mix		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 2500						
2501	Materials for corrugated steel buried structures exceeding 900mm clear span or internal diameter				Type approval applies	
		Steel components		Required as appropriate to the standard or specification listed in the type approval Certificate		
		Zinc coating				
		Protective coating				
	Paved invert system			Product Acceptance Scheme or equivalent applies		
2502	Materials for reinforcing elements, prefabricated facing and capping units, and washers				Product Acceptance Scheme or equivalent applies	
		Carbon steel strip		Required (BS 1449: Part 1.1 or BS EN 10025-1) and (BS EN 10025-2)	Silicon content and mechanical properties to be stated on the certificate	
		Stainless steel strip		Required (BS EN 10029, 10048, 10051, 10258 and 10259)	Mechanical properties to be stated on the certificate	
		Reinforcing bar for anchor elements		Required (BS 4449+A3)	Tests scheduled under Clauses 1717 and 1909 are required for welding and galvanising of anchor elements	
		Materials for fasteners				
			Stainless steel			
		Bolts, screws and nuts				
2503	Materials for pocket type reinforced brickwork retaining wall structures					
		Clay bricks	(Soluble salt content; Efflorescence; Compressive strength Water absorption; and Initial rate of suction) (BS 3921 and BS EN 771-1:2011+A1:2015 / TRL Report 447) (N)	1 set of tests per type of brick		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2500 (continued)					
2504	Environmental barriers	Timber			Quality management scheme applies
		Concrete			
		Steel			
		Brickwork			
		Other materials			
	Barriers	Sound absorption	As required in Appendix 25/4		
Sound insulation					
	Post foundations	Loading test on site	As required in Appendix 25/4		
2505, 2506	Drainage structures/buried rigid pipes for drainage structures. Pipes for drains and culverts having diameters or clear span exceeding 900 mm				
	Vitrified clay				
	Concrete PC/SRC	(Manufacturer's test)			See sub-clause 2506.28
	Iron				
	Corrugated steel	(Manufacturer's test)			Type Approval Certificate and Product Acceptance Scheme or equivalent apply.

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2600					
2601	Bedding mortar materials			Required for each batch	Certification in accordance with Clause 2601 is required
	Bedding Mortar	Flow cone test	Each batch		Laboratory tests
		Flow between glass plates			
		Compressive strength			
		Expansion test			
		Water absorption			
		Elastic stability	1 per source		
	Flow cone test Compressive strength	Each load		Site control tests	
2604	Plastic coating to fencing posts, gates and ancillaries			Required (BS 1722 : Part 16)	Certification by powder manufacturer and coating applicator is required.
2607	Granolithic concrete				Testing to be in accordance with Clauses 1702, 1703, 1707 and 1710

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 3000					
3001	General				Inspection reports as required in Appendix 30/1
3005	Grass Seeding, Wildflower Seeding and Turfing	Rate of spread of fertiliser	1 per 1000 square metres		
		Rate of spread of seeding	1 per 1000 square metres		
		Chemical analysis of fertiliser	1 per source		
		Grass seed germination and purity (Official Seed Testing Station tests)	1 per source and mix variety	Required prior to sowing	

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (Continued)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 5000						
5003	Abrasives	Grading	As required			
		Hardness				
5005	Aluminium and zinc spray coatings	Test specified in BSI BS EN ISO 2063	As required		Areas to be tested in accordance with Clause 5006	
						Aluminium coating material
	Zinc coating material	Required (BS EN 1179)				
	Sheradized coatings	Tests specified in BS 7371-8	As required			
	Zinc electroplated coatings	Tests specified in BS 7371-3	As required			
	Plating to high strength grip and tension control bolts					
5006	Metal spray coatings	Tensile test specified in BSI BS EN ISO 2063	As required			
		Grid test specified in BSI BS EN ISO 2063	As required			
5007SE	Paints					
		'A' and 'B' Samples	Specific gravity			Samples will be selected in accordance with Clause 5007SE
			Colour match			
			Composition			
			Application Characteristics			

APPENDIX 1/6: SUPPLY AND DELIVERY OF SAMPLES TO THE OVERSEEING ORGANISATION

When required by the Engineer the Contractor shall provide samples of any material proposed to be incorporated in the Works.

APPENDIX 1/7: SITE EXTENTS AND LIMITATION ON USE
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1. Site Extent

- 1.1 The Site Extent is defined in Clause 1 of the Conditions of Contract as 'Land Made Available by the Employer for the Works' and comprise:
- (i) The Land Made Available by the Employer for the Works is described in Section 3.1 of the Employer's Requirements.
 - (ii) Any further Land acquired by or conveyed to the Employer (from any person, including the Contractor) from time to time for the purposes of the Design and the Works.
 - (iii) The Contractor shall make provision for carrying out work on private land as required under the Contract for example Accommodation Works, traffic signing, drainage works and the like.

2. Limitations On The Use Of The Site

The Site shall be used solely for the construction and maintenance of the Works.

- 2.2 The Contractor's attention is drawn to the Special Requirements listed in Clauses 77 and 78 of the Conditions of Contract.
- 2.3 The Contractor shall not use areas of land with a temporary right of access for any purpose other than the construction and maintenance of the Works.
- 2.4 When carrying out Accommodation Works on land not made available by the Employer for the Works, the Contractor shall minimise the area of land occupied to that which is essential for the safe construction and maintenance of such part of the Works.
- 2.5 The Contractor shall ensure that all areas of land which have been temporarily occupied are reinstated to the satisfaction of the affected landowner, occupier and the relevant Authorities.
- 2.6 The Contractor will be given access to the Land Made Available by the Employer for the Works on the Contract Date, with the exception of the areas designated on Drawing Series B1557602/CD/LMA Sheet 1 to 9.

APPENDIX 1/8: OPERATIVES FOR THE OVERSEEING ORGANISATION

The following specification fulfils the operative requirements for the Whole of the Works.

Operatives	Number	Period Required
Driver / Handyman	1 available on request	From Date of Commencement of the Works as defined in Clause 41 of the Conditions of Contract to date of issue of Certificate of Completion

APPENDIX 1/9: CONTROL OF NOISE AND VIBRATION

Noise Control

1. The Contractor shall consult and comply with the requirements of Perth and Kinross Council prior to commencement of work on Site.

These requirements, together with the Contractor's proposed methods of work and Constructional Plant to be used shall be discussed and agreed in writing by Perth and Kinross Council prior to commencement of the relevant activities on Site.

2. The Contractor shall comply with the contents and recommendations of BS 5228-1: 2009 + A1: 2014 "Code of Practice for Noise and Vibration Control on Construction and Open Sites, Part 1: Noise and Part 2 Vibration", together with the specific requirements of this Appendix. Reference should also be made to Department for Environment, Food and Rural Affairs "Update of Noise Database for Prediction of Noise on Construction and Open Sites" when predicting noise levels.
3. All Constructional Plant used on the Works shall be subject to the acknowledgement of the Overseeing Organisation and shall be the quietest of its type practical for carrying out the work required and shall be maintained in good condition with regard to minimising noise output.

All Constructional Plant shall be operated and maintained in accordance with the manufacturer's written recommendations.

4. Best practicable means shall be employed including the positioning of Constructional Plant and activities to minimise noise at sensitive locations, the use of mufflers on pneumatic tools, the use of non-reciprocating Constructional Plant and the use where practical of effective sound reducing enclosures to ensure all Constructional Plant used in connection with the Works operates with the minimum of noise.
5. Subject to the other requirements of the contract the normal working hours within the Site shall be Monday to Friday between 07.30 and 18.00 hours and Saturday between 08.00 and 13.00 hours, with no working on Sundays and public holidays.

The Contractor shall have written permission to operate at the relevant permissible noise levels for each area, within the normal working hours, from Perth and Kinross Council.

The Contractor shall apply, in writing, for permission to work outside normal working hours, including Sundays and public holidays, to Perth and Kinross Council, at least 14 days in advance of the proposed work. Operating times and noise levels shall be subject to the agreement and written consent of Perth and Kinross Council.

In the event of permission being granted, in writing, the Contractor shall provide the Overseeing Organisation with a copy of the written permission at least 48 hours prior to commencing the work.

The Contractor shall also arrange for leaflets to be delivered to residents within 200 metres of the Site boundary, giving a full description of the proposed Works and their duration and of the sources, character and levels of noise expected to arise, and a named contact to respond to any noise or vibration concerns. The leaflets shall be issued 48 hours prior to Works commencing.

6. The construction noise levels, L_{Aeq} from the locations specified in the Schedule contained in this Appendix shall not exceed the appropriate level agreed with Perth and Kinross Council.
7. Notwithstanding the specific requirements of this Appendix 1/9, the Contractor shall comply with the contents of The Noise Insulation (Scotland) Regulations 1975.
8. A pre-construction ambient noise assessment shall be undertaken by the Contractor using an appropriately qualified acoustician before the Works commence, for agreement with Perth

APPENDIX 1/9: CONTROL OF NOISE AND VIBRATION (Continued)
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and Kinross Council. The noise assessment shall demonstrate the typical pre-construction ambient noise levels at representative properties adjacent to the Works.

9. Measurement locations chosen for the pre-construction ambient noise assessment shall be representative of surrounding properties, shall be considered the "worst case" property in terms of construction noise impacts for that particular area.
10. The Contractor's noise expert shall be required to undertake additional assessments or noise measurements at locations using methods agreed previously in writing with Perth and Kinross Council as necessary.
11. Certificates of Consent from Perth and Kinross Council under Section 61 of the Control of Pollution Act 1974 shall be required for any work outwith the normal working hours, defined in Clause 5 of this Appendix.

The granting of such Certificates will be dependent amongst other things on the Contractor demonstrating to the satisfaction of Perth and Kinross Council in his application that;

- (i) It is not reasonably practicable to carry out the work during normal working hours;
- (ii) He has considered all mitigation measures and has implemented appropriate measures;
- (iii) He has consulted all interested parties; and
- (iv) He has explored all means to reduce the amount of work to be carried out outwith normal working hours.

A Certificate of Consent shall be required for each and every occasion when the Contractor proposes to work out-with normal working hours.

12. Permissible construction noise levels shall avoid significant effects in accordance with Annex E of BS 5228-1:2009+A1:2014.
13. Screening shall be provided for Broompark prior to the start of construction in accordance with the recommendations set out in Chapter 20 of the Environmental Statement.

APPENDIX 1/9: CONTROL OF NOISE AND VIBRATION (Continued)
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Vibration Control

1. The Contractor shall consult and comply with the requirements of Perth and Kinross Council, as appropriate, prior to commencement of work on Site. These requirements, together with the Contractor's proposed methods of work and Constructional Plant to be used shall be discussed and agreed in writing by Perth and Kinross Council, as appropriate, prior to commencement of the relevant activities on Site.
2. The Contractor shall provide Consultation Certificates in accordance with the Certification Procedure in respect of this requirement.
3. Significant effects shall be avoided in accordance with Annex B of BS 5228-2:2009+A1:2014.
4. The Contractor shall provide written details of the proposed method and periodicity of monitoring of the Vibration Dose Value, to Perth and Kinross Council and the Overseeing Organisation.
5. The Contractor shall carry out a risk assessment of the effects of Design, construction and maintenance on the structural integrity of adjacent buildings.
6. The Contractor shall carry out a structural or dilapidation survey of all buildings that are considered to be at risk and inform the Overseeing Organisation in advance such that the survey can be witnessed, and provide a copy of the survey to the Overseeing Organisation prior to construction of the Works commencing.

Vibration Monitoring Equipment

1. To ensure compliance with the specified vibration limits, monitoring shall be undertaken by the Contractor using a vibration monitor compliant with BS EN ISO 8041:2005.

Consultations

All consultations shall be undertaken with Perth and Kinross Council Transport, Environment and Community Services,

Contact: [REDACTED]

Email: [REDACTED]

Telephone: [REDACTED]

APPENDIX 1/10: PERMANENT WORKS TO BE DESIGNED BY THE CONTRACTOR

1. Refer to the Employer's Requirements for details of Permanent Works to be designed by the Contractor.

APPENDIX 1/11: TEMPORARY WORKS DESIGN

1. Refer to the Employer's Requirements for details of Temporary Works to be designed by the Contractor.

APPENDIX 1/12: SETTING OUT AND EXISTING GROUND LEVELS

1. The Contractor shall supply setting out information, including a schedule of co-ordinated survey stations, to the Overseeing Organisation whenever such information is available, updated or revised.
2. Clearly marked chainage markers at 50 metre intervals shall be erected by the Contractor at suitable locations for the duration of the Works.
3. Before commencement of any earthworks, the Contractor shall establish permanent survey stations within the Site sufficient for the setting out and checking of the Works.

APPENDIX 1/13: PROGRAMME OF WORKS

1. Form of Programme

The Contractor shall provide the programme in the form of a Time Chainage Chart supported by Bar Charts as follows:

1.1 The work required for the Design and the Works shall be subdivided into individual distinct operations, which shall be illustrated in the Time/Chainage Chart and the Bar Charts.

1.2 (i) The Time Chainage Chart shall be ruled in columns and rows using a horizontal scale of chainage (min. 1:10,000, i.e. 10 millimetres wide column per 100 metres) and a vertical scale of Time (minimum 0.5 centimetres high row per week). On the Time Chainage Chart the Contractor shall plot his programme start (date/chainage point) and finish (date/chainage point) for each Milestone, and shall draw a line (the "Milestone Line") connecting each start point to the corresponding finish point for that operation. The Milestone Line shall be taken as a representation of the Contractor's programmed average rate of progress of that operation from its start to its finish by reference to the date and chainage at intermediate (date/chainage) points along the Milestone Line. The Overseeing Organisation shall have the right to require the Contractor to provide further details by sub-dividing operations and showing corresponding Operation Lines for each sub-division.

(ii) Where at a particular part of the Works there is a local concentration of individual distinct operations which cannot be satisfactorily represented by Milestone Lines (e.g. at a Structure, etc) such operations shall be shown on the Time/Chainage Chart as a rectangular box (the "Operations Box") whose diagonal is the Operation Line for all operations required for that part of the Works considered en bloc. Each Operations Box shall be named to identify the part of the Works to which it refers and shall show the number of the Bar Chart (refer below) on which these operations are illustrated.

(iii) The Time Chainage Chart shall show along its top diagrammatic plan (the "Diagram") showing, suitably annotated, the features of the parts of the Works represented by the Chart. The Diagram shall be drawn to the same horizontal scale as the Time Chainage Chart, and be aligned with the chainage columns of the chart in vertical projection.

1.3 The Overseeing Organisation shall have the right to reasonably require the Contractor to provide a Bar Chart for any part of the Works and the Contractor shall comply with such requirement. Bar Charts shall list the location and description of the operations to which they refer and show for each listed operation a horizontal bar indicating the start, duration and stop date of that operation plotted to a horizontal scale of time. Bar Charts shall be provided by the Contractor for all operations contained in the Operations Boxes. The Overseeing Organisation shall have the right to require the Contractor to introduce additional Operations Boxes into the Time Chainage Chart and the Contractor shall comply with such requirement and to supply to the Overseeing Organisation the amended Time Chainage Chart and Bar Charts.

2. At the time of presentation of the programme the Contractor shall also provide a mass-haul diagram showing his intended earthworks movements and locations and capacities of anticipated plant and other resource input.

APPENDIX 1/13: PROGRAMME OF WORKS (Continued)

3. Schedule of Constraints

The programme shall take account of constraints imposed by the Employer's Requirements and the Specification in respect of but not limited to:

- (i) Work to Privately and Publicly Owned Services and Supplies and, in particular, cognisance shall be given to the Notice Periods and liaison stipulated in Appendix 1/16. Notice Periods and Time to Completion shall be shown on the Programme. Advance Works shall also be shown on the Programme where relevant;
- (ii) Restrictions arising from advance utility diversion works - British Telecommunications Plc. (Openreach) have been instructed to undertake advance works comprising temporary diversions BT-04 and BT-05 as detailed in the Employer's Requirements Volume 3 Part 2 Section 5.2 and in Appendix 1/16. The Notices for these works are listed in the Employer's Requirements volume 3 Part 3 Appendix E. These works will be on site prior to Contract Award and will continue thereafter. Until such time as these works are completed the Contractor should allow for potential disruption and exclusion of access from areas of the site required both for the diversionary works and for the protection of the existing utilities being diverted. The Contractor is to allow sufficient time for these works to be completed before commencing works in the area;
- (iii) Restrictions arising from advance utility diversion works - CTIL will be undertaking mast relocation works adjacent to the western LMA boundary at Cairnleith Moss (approximately CH7770). A new mast will be installed set back from the LMA, along with supporting services, and the existing mast immediately adjacent to the LMA will be removed. These works will commence prior to Contract Award and will continue thereafter. Until such time as these works are completed there is the potential for disruption due to the close proximity to the LMA and the need for service connections to be installed. The Contractor is to allow sufficient time for these works to be completed before commencing works in the area;
- (iv) Liaison with National Grid and compliance with their Management Procedure for the Management of New Works, Modifications and Repairs on the National Transmission System (T/PM/G/35);
- (v) Traffic Safety and management. Refer to Appendix 1/17 for more detailed constraints, Notice Periods and consultation requirements, which should all be shown on the Programme;
- (vi) Restrictions arising from the use of substances hazardous to health;
- (vii) Restrictions arising from advanced tree felling works including associated traffic management. These works will commence prior to Contract Award and will continue thereafter. Until such time as these works are completed there is the potential for disruption. The Contractor shall allow sufficient time for these works to be completed before commencing works in the affected areas;
- (viii) Compliance with technical approval procedures in relation to Structural Elements and other Features to be designed by the Contractor, including awaiting approvals, resubmissions and modifications. Refer to Appendix 1/11. The Contractor shall show this on the Programme;
- (ix) Not used;
- (x) The Contractor shall demonstrate to the Overseeing Organisation that he has available in a suitably located stockpile an adequate supply of surface dressing chippings which will enable him to not only commence the Works on the due date,

APPENDIX 1/13: PROGRAMME OF WORKS (Continued)

- but will enable him to progress the work at such a rate as will ensure compliance with the Programme of Works including traffic management;
- (xi) Submission by the Contractor of Road Restraint Systems for acceptance, including awaiting acceptance and resubmission;
 - (xii) Availability of offices for the Overseeing Organisation and the Engineer and the Required Time Duration for Providing and Maintaining Accommodation and Equipment as defined in Appendix 1/1;
 - (xiii) Not used;
 - (xiv) Scottish Water service connections as required by the Accommodation Works and the Drainage design, including the applications, approvals, resubmissions and modifications. Refer to Appendix 1/15 (and associated drawings) and the Drainage design for all requirements;
 - (xv) Private access and egress requirements throughout construction as described in Appendix 1/15; and
 - (xvi) Erection of fencing to protect areas of vegetation to be retained prior to the main construction operations.
- 3.1 The level of detail should be not less than the following:

Level 1

Within 21 days after the acceptance of Tender and any subsequent revision

- (i) Each Structure.
- (ii) Earthworks-each cutting and embankment.
- (iii) Roadworks-in lengths not exceeding 1.0 km for main route and for each side road, link road and slip road:
 - (a) Fencing;
 - (b) Site clearance;
 - (c) Topsoil strip;
 - (d) Drainage (pre-earthworks and second stage);
 - (e) Sub-base;
 - (f) Sub-grade improvement layer;
 - (g) Base or concrete paving;
 - (h) Surfacing; and
 - (i) Drilling / grouting.
- (iv) Major Apparatus and Private Apparatus.
- (v) Traffic management measures including operation of site accesses, plant crossings and temporary diversions for traffic.
- (vi) Landscaping Works and planting seasons.

Level 2

At least four weeks before the commencement of any item of work:

- (i) For each structure:

APPENDIX 1/13: PROGRAMME OF WORKS (Continued)

- (a) Piling;
 - (b) Substructure;
 - (c) Superstructure; and
 - (d) Finishes.
- (ii) Roadworks:
As for Level 1 but intervals not exceeding 200 m and including lighting, signing, soiling and seeding, road marking, cabling and communications equipment.
- (iii) All Undertaker's Works and Private Apparatus Works.

Level 3

Further breakdown of items and other details as may be required.

4. The Contractor shall provide the Overseeing Organisation with a programme in the form of a bar chart for the Planting Works, and shall show the level of detail appropriate to each stage of the Works and all activities and restraints, each of which shall be given a short title.

All events shall be numbered and annotated with the earliest and latest event dates.

The programme shall be submitted four weeks before the commencement of any work and shall detail the main areas of Work as follows:

- (i) Early landscape Works which may be carried out in advance of the main Works;
- (ii) Landscape implementation Works;
- (iii) Maintenance for each relevant fifty two week period.

- 4.1 The level of detail for areas of trees, shrubs and grass shall not be less than the following:

- (i) For implementation:
 - (a) soil preparation;
 - (b) protective fencing and other measures;
 - (c) seeding and fertiliser; and
 - (d) planting and fertiliser.
- (ii) For maintenance:
 - (a) grass cutting;
 - (b) Site scavenge;
 - (c) pernicious weed control;
 - (d) re-firming of plants and adjustment of stakes and ties;
 - (e) disease and pest inspection;
 - (f) watering;
 - (g) fertiliser; and
 - (h) protective fence check and repair.

5. The Contractor shall provide all of the information described above in both paper copy (3 copies of each) and electronically (one copy of each).

APPENDIX 1/13: PROGRAMME OF WORKS (Continued)

In addition the Contractor shall note that the programme shall be produced using Microsoft Project 2016 or the current version as supplied in accordance with Appendix 1/1.

No other format shall be used.

Such software shall be provided to the engineer prior to submission of the Contract Programmes.

APPENDIX 1/14: PAYMENT APPLICATIONS

The monthly statements submitted to the Engineer by the Contractor in accordance with Clause 60 of the Conditions of Contract shall inter alia set out in detail the Schedule of Payments which are either [REDACTED]complete for each Milestone.

APPENDIX 1/15: ACCOMMODATION WORKS

1. Accommodation Works, and elements of the main works that are provided for the benefit of various affected parties, that have been agreed are shown on the following Schedules and their locations on the Accommodation Works Drawings listed in Appendix 0/4 of the Specification.
2. Not used.
3. The Contractor shall complete Accommodation Works as soon as practicable after the date of commencement of the Works.
4. Notwithstanding this, private access shall be provided across the Site to adjoining landowners and affected parties to the same level as that which shall be provided by the Accommodation Works and until such time as the Accommodation Works are complete.
5. The access tracks at the various locations defined in the following schedules shall be designed to comply with the following parameters.
 - (i) Minimum horizontal radius and curve widening to suit agricultural vehicle and UK Freight Transport Association Design Articulated Vehicle (1998) (16.48 metres long) use. The Design shall allow for use by a tractor and trailer combination and modern combine harvesters in transportation configuration.
 - (ii) Maximum vertical gradient shall be nominally 8% however the gradient may be increased to 15% over short lengths with the agreement of the Landowner.
 - (iii) Verges, 1 metre wide shall be provided on both sides of all access tracks over the full length of the access track unless specified otherwise.
6. Where Accommodation Works fencing is indicated along the boundary of the Land Made Available by the Employer for the Works, the fence shall be set parallel to the boundary with fence posts contiguous to the boundary and with the fence outside the Land Made Available by the Employer for the Works, with the following exception(s):
 - (i) Where Accommodation Works fencing is provided for Scottish Ministers, the fencing shall be inside the Land Made Available by the Employer for the Works.
7. The fencing and gate types in the Accommodation Works Schedules are shown on the Standard Details as listed in Appendix 0/4 of the Specification.
8. Accommodation Works fencing shall be connected to adjacent existing fencing to ensure continuity of the fence.
9. Where water supplies are to be provided as part of Accommodation Works the Contractor shall make every effort to ensure that the installation prevents freezing of the water supply. Any lagging to pipe work shall be robust to prevent damage from livestock.
10. The exact location of all gates, water troughs, holding pens and the like shall be agreed with the relevant landowner and occupier prior to installation.
11. Where access tracks cross existing watercourses, drainage ditches and the like, these shall be piped or bridged and provide the carriageway and verge dimensions prescribed for the adjoining access track. Where watercourses are to be piped or bridged as part of the Accommodation Works, the Contractor shall carry out the Design in accordance with the Employer's Requirements.
12. In the following schedules 'HCD' is defined as the Highway Construction Details contained in the Manual of Contract Documents for Highway Works, Volume 3.
13. Not Used
14. Where tracks are to be provided with adjacent drainage ditches, the ditch shall be of uniform depth with invert gradient which follows that of the track. Offlet culverts shall be provided under the built track with ditch blockers installed immediately downstream of the offlet culvert

inlet such that the volumes of flows in the ditches is reduced and an even redistribution of runoff onto the existing ground is provided.

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/008/01	
OWNER(S) [REDACTED]	OCCUPIER [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
008/01	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/028/01 and B1557602/AW/028/02	
OWNER(S) [REDACTED]	OCCUPIER 1. [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
028/01	[REDACTED]
028/02	[REDACTED]
028/03	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/083/01, B1557602/AW/083/02, B1557602/AW/083/03 and B1557602/AW/083/04	
OWNER(S) [REDACTED]	OCCUPIER [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
083/01	[REDACTED]
083/02	[REDACTED]
083/03	[REDACTED]
083/04	[REDACTED]
083/05	[REDACTED]
083/06	[REDACTED]
083/07	[REDACTED]
083/08	[REDACTED]
083/09	[REDACTED]
083/10	[REDACTED]
083/11	[REDACTED]
083/12	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/085/01	
OWNER(S) [REDACTED]	OCCUPIER [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
085/01	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/095/01 and B1557602/AW/095/02	
OWNER(S)	OCCUPIER
[REDACTED]	[REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
095/01	[REDACTED]
095/02	[REDACTED]
095/03	[REDACTED]
095/04	[REDACTED]
095/05	[REDACTED]
095/06	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/096/01	
OWNER(S) [REDACTED]	OCCUPIER [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
096/01	[REDACTED]

*[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/100/01	
OWNER(S)	OCCUPIER
[REDACTED]	1. [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
100/01	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/101/01	
OWNER(S) [REDACTED]	OCCUPIER [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
101/01	[REDACTED]
101/02	[REDACTED]
101/03	[REDACTED]
101/04	[REDACTED]
101/05	[REDACTED]
101/06	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/102/01 and B1557602/AW/102/02	
OWNER(S) [REDACTED]	OCCUPIER [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
102/01	[REDACTED]
102/02	[REDACTED]
102/03	[REDACTED]
102/04	[REDACTED]
102/05	[REDACTED]
102/06	[REDACTED]
102/07	[REDACTED]
102/08	[REDACTED]

*[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/104/02	
OWNER(S) [REDACTED]	OCCUPIER [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
104/01	[REDACTED]
104/02	[REDACTED]

*[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/109/01	
OWNER(S) [REDACTED]	OCCUPIER [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
109/01	[REDACTED]
109/02	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/110/01 and B1557602/AW/110/02	
OWNER(S)	OCCUPIER
[REDACTED]	1. [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
110/01	[REDACTED]
110/02	[REDACTED]
110/03	[REDACTED]
110/04	[REDACTED]
110/05	[REDACTED]
110/06	[REDACTED]
110/07	[REDACTED]
110/08	[REDACTED]
110/09	[REDACTED]
110/10	[REDACTED]
110/11	[REDACTED]
110/12	[REDACTED]
110/13	[REDACTED]
110/14	[REDACTED]
110/15	[REDACTED]
110/16	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

110/17	[REDACTED]
110/18	[REDACTED]
110/19	[REDACTED]
110/20	[REDACTED]
110/21	[REDACTED]
110/22	[REDACTED]
110/23	[REDACTED]
110/24	[REDACTED]
110/25	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/113/01	
OWNER(S) [REDACTED]	OCCUPIER [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
113/01	[REDACTED]

*[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/124/01	
OWNER(S) [REDACTED]	OCCUPIER 1. [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
124/01	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/145/01	
OWNER(S) [REDACTED]	OCCUPIER 1. [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
145/01	[REDACTED]
145/02	[REDACTED]
145/03	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/186/01	
OWNER(S) [REDACTED]	OCCUPIER 1. [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
186/01	[REDACTED]
186/02	[REDACTED]
186/03	[REDACTED]

* [REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/188/01	
OWNER(S) [REDACTED]	OCCUPIER 1. [REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
188/01	[REDACTED]

*[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

A9 DUALLING: LUNCARTY TO PASS OF BIRNAM	
APPENDIX 1/15 - SCHEDULE OF WORKS	
REFER TO DRAWING NO. B1557602/AW/194/01, B1557602/AW/194/02, B1557602/AW/194/03, B1557602/AW/194/04 and B1557602/AW/194/05	
OWNER(S)	OCCUPIER
[REDACTED]	[REDACTED]
LIST OF WORKS REQUIRED	
Ref No.	Requirements
194/01	[REDACTED]
194/02	[REDACTED]
194/03	[REDACTED]
194/04	[REDACTED]
194/05	[REDACTED]
194/06	[REDACTED]
194/07	[REDACTED]
194/08	[REDACTED]
194/09	[REDACTED]
194/10	[REDACTED]
194/11	[REDACTED]
194/12	[REDACTED]
194/13	[REDACTED]
194/14	[REDACTED]
194/15	[REDACTED]

APPENDIX 1/15: ACCOMMODATION WORKS (Continued)

194/16	[REDACTED]
194/17	[REDACTED]
194/18	[REDACTED]
194/19	[REDACTED]
194/20	[REDACTED]
194/21	[REDACTED]
194/22	[REDACTED]
194/23	[REDACTED]
194/24	[REDACTED]

*[REDACTED]

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES

Undertakers Works

1. Notwithstanding any information provided in this Schedule of Privately and Publicly Owned Services and Supplies for the Design, construction, completion and maintenance of the Works, the Contractor shall consult and comply with the requirements of all Undertakers necessary to determine the effect of the Design, construction, completion and maintenance of the Works on Apparatus, and to arrange any alterations of any Apparatus or Private Apparatus which, in the opinion of the Undertakers, may be necessary for or resulting from the Design construction, completion and maintenance of the Works.
2. The Contractor shall make arrangements with the Undertakers and others concerned for the coordination of the Design, construction, completion and maintenance of the Works with all Undertakers' Works and otherwise required to be carried out concurrently with the Design, construction, completion and maintenance of Works.
3. The Contractor shall make arrangements with Undertakers and others for the phasing of all necessary Undertakers Works affected by or forming part of the Works.
4. The Contractor shall consult and comply with all Undertakers and others in connection with diversion routes, road closures, interruptions to supplies and otherwise while Undertakers Works are being carried out.
5. The Contractor shall comply with any periods of notice given by Undertakers.

Any such compliance by the Contractor shall not relieve the Contractor of any of his other obligations under the Contract.

6. The locations of:
 - (i) existing Apparatus;
 - (ii) existing Private Apparatus; and
 - (iii) any advance Undertakers Works

shown on the Drawings listed in Appendix 0/4 of the Specification are approximate only.

The Contractor shall satisfy himself as to the exact location of all Apparatus and Private Apparatus (including private water supplies) prior to carrying out work in any part of the Site.

No warranty or representation is given by the Employer as to the accuracy or completeness of any such information.

The Employer shall be under no liability for any error, misstatement or omission, and none of such information shall constitute a contract or part of a contract between the Employer and the Contractor and shall not create a duty of care by the Employer to the Contractor.

7. The Contractor shall satisfy himself that the Design construction, completion and maintenance of the Works take account of all existing Apparatus whether or not such existing Apparatus are shown on any Drawings listed in Appendix 0/4 of the Specification.
8. Apparatus and/or Private Apparatus to individual properties have not been shown on the Drawings listed in Appendix 0/4 of the Specification.

The Contractor shall make arrangements with Undertakers and relevant owners of Private Apparatus and others concerned for the phasing of all necessary Undertakers Works and Private Apparatus Works affected by the Design construction, completion and maintenance of the Works.

9. The names, addresses and telephone numbers of the Undertakers with Apparatus in the locality of the Site include, but not limited to, those described in Table 1/16A.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Notwithstanding the names, addresses and telephone numbers of the Undertakers with Apparatus in the locality of the Site including, but not limited to, those described in Table 1/16A or the Undertakers referred to elsewhere in the Contract, the Contractor shall satisfy himself as part of the Design, construction, completion and maintenance of the Works that he has consulted and complied with the requirements of all Undertakers and any others affected by the Design construction, completion and maintenance of the Works.

Table 1/16A

Undertakers and other Companies	Address and Telephone Number	Contact
British Telecommunications (Openreach) plc	[REDACTED]	[REDACTED]
Scottish and Southern Energy	[REDACTED]	[REDACTED]
Scottish Water	[REDACTED]	[REDACTED]
Scotland Gas Networks	[REDACTED]	[REDACTED]
National Grid	[REDACTED]	[REDACTED]
CTIL	[REDACTED]	[REDACTED]

Private Apparatus Works

10. The Contractor shall consult and comply with Undertakers and relevant parties for Private Apparatus Works to determine the effect of the Design, construction, completion and maintenance of the Works and Undertaker's Works on Private Apparatus.
11. The Contractor shall bear the cost of all Private Apparatus Works or any other work which may be required for the Design construction completion and maintenance of the Works.
12. It shall be the Contractor's responsibility to co-ordinate all Undertakers Works and Private Apparatus Works or future provision Works to meet the requirements of Undertakers or relevant owners of Private Apparatus not withstanding any indicative diversions identified in this Appendix.

General

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

13. The Contractor shall consult and comply with BT Openreach plc regarding the supply of ducting, ironwork or otherwise for their Undertaker's Works.
- All other ducting and ironwork for all other Undertakers Works and Private Apparatus Works required in connection with the Design, construction, completion and maintenance of the Works shall be provided by the Contractor.
- Ducting forming part of the Design, construction, completion and maintenance of the Works shall be to the satisfaction of the appropriate Undertakers or others concerned.
14. Within the Indicative Schedule of Undertakers Works for the Works contained in this Appendix chainage is referenced to the Left (L) and Right (R) of chainage points relative to the direction of increasing chainage and is given in metres.
- All chainages are approximate.
15. The Contractor shall be responsible for all traffic management associated with the Works in connection with all Undertakers Works and Private Apparatus Works required to be carried out in accordance with the Contract.
16. Not used.
17. The Contractor shall carry out all works required resulting from the requirement upon the Contractor to consult and comply with the requirements of the Undertakers and the other provisions of the Contract to enable the Undertakers Works in the Indicative Schedule of Undertakers Works contained in Table 1/16B to be completed.
18. Subject to the other provisions of this Appendix 1/16 and the other provisions of the Contract, the additional requirements of services and service ducts in Structures shall be shown separately in Appendix B of the Employer's Requirements.
19. British Telecommunications plc
- (i) All work carried out for British Telecommunications plc shall be in accordance with the edition, current at the Reference Date, of the British Telecommunications Underground Duct Laying and Associated Works Specification LN550 Rev A and the associated specifications and drawings referred to therein.
 - (ii) Before the commencement of any of the notification periods to attend Site specified in the Indicative Schedule of Undertaker's Works British Telecommunications plc require a Design and material procurement period, the duration of which has not been advised, to enable British Telecommunications plc to carry out the following:
 - (a) examine the Contractors detailed Design drawings for the protection and diversion Works to the British Telecommunications plc services, including cross sections;
 - (b) discuss with the Contractor and agree a detailed programme of Works which is acceptable to British Telecommunications plc; and
 - (c) prepare the first Works instruction to British Telecommunications plc field staff.
 - (iii) The Contractor shall programme, with respect to the Works estimate periods (Works by Undertakers) to allow British Telecommunications plc to carry out their element of the diversion Works.
20. Scottish Water
- The Design of permanent water main diversions for Scottish Water shall be carried out in accordance with the Civil Engineering Specification for the Water Industry (CESWI) 5th Edition.
21. Scottish and Southern Energy

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

All Works carried out for Scottish and Southern Energy shall be in accordance with the Health and Safety Guidance Notes HSG47 and GS6 which give advice on the Avoidance of Danger from Underground Cables and Overhead Lines respectively.

In accordance with Health & Safety Guidance Note HS (G) 47 care will be necessary when digging in proximity to underground cables, particularly if mechanical excavators are used.

Before undertaking any work which is within 6 metres horizontal distance of an underground cable, or within 9 metres horizontal distance of a wooden pole overhead line, a site meeting is required to agree method of working, type of mechanical excavators etc and how they will be used when working in the proximity of cables, lines or plant.

22. Scotland Gas Networks

Safe digging practices, in accordance with HSE publication HSG47 "Avoiding Danger from Underground Services", must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used.

The Contractor shall ensure that SGN can gain access to apparatus throughout the Works.

No mechanical excavations are to take place above, or within 0.5m of low pressure system, 2m of the medium pressure system and 3 metres of the intermediate pressure system.

The Contractor shall consult and comply with SGN and undertake the design and construction of protective measures for the Local High Pressure Gas Main which crosses the Gelly / Murthly Access Track. The design and construction of protective measures shall be in accordance with SGN/SP/CE/12 The Design, Construction and Testing of Civil and Structural Works Part Twelve: Pipeline Protection Slabs and subject to the approval of SGN.

23. National Grid

All persons working on or near National Grid's apparatus must follow the requirements of the HSE Guidance Notes HSG47 – Avoiding Danger from Underground Services and GS6 – Avoidance of danger from overhead electric power lines.

If working in the vicinity of a high pressure gas pipeline the following document must be followed: 'Specification for Safe Working in the Vicinity of National Grid High pressure Gas Pipelines and Associated Installations – Requirements for Third Parties (SSW22).

The Contractor shall consult and comply with National Grid regarding measures to protect the High Pressure Transmission Mains. The Contractor shall design and construct protective measures for the National Grid High Pressure Transmission Mains to protect from the construction and operation of the Existing/New A9, Junction Slip Roads, Side Roads and associated earthworks as determined necessary by National Grid. These measures shall be designed and constructed in accordance with T/SP/CE/12 The Design, Construction and Testing of Civil and Structural Works Part Twelve: Protection Works over Steel Pipelines. The process of providing protection measures for National Grid's apparatus will be managed by National Grid in accordance with their procedure T/PM/G/35. Procedure T/PM/G/35 will also apply for any works by National Grid in undertaking adjustments or modifications to the existing nitrogen fill / cathodic protection systems protecting the apparatus required in connection with the Design, construction, completion and maintenance of the Works.

24. CTIL

The Contractor shall consult and comply with CTIL to ensure that construction works do not conflict or adversely impact the existing mobile telecommunications mast or the construction of the new telecommunications mast until the new mast is fully commissioned and the existing mast installation demolished and removed from Scottish Ministers lands. The Contractor shall also facilitate CTIL construction works and access required for their new mast (and associated infrastructure) installation and commissioning and removal of the existing installation.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

25. There are no known diversions of private supplies.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

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APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works			
TELECOMMUNICATIONS			
Reference Drawing Reference	General Description of Services	UG, OH or OG	Works by Undertakers
BT-01 (Temporary) B1557602/CD/2721/005	Diversion of armoured feed to Cramflat and Pitlandie farms.	OG and UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and chambers. 4. Install temporary cable.
BT-02A (Temporary) & BT-02B B1557602/CD/2721/005	<p>BT-02A - Provision of temporary armoured feed to Northleys farm.</p> <p>BT-02B - Contractor to bury temporary cable (BT02A) in new verge during construction works. This will become the permanent diversion for BT-02.</p>	OG and UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and chambers. 4. Install temporary cable.
BT-03 B1557602/CD/2721/005	<p>Provision of permanent armoured feed in the south verge of the new Pitlandie Overbridge. Contractor to bury cable during verge works.</p> <p>New pole to be erected and one span of aerial cable to be connected to existing CP2 and transfer all circuits.</p>	OH and UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install cable. 4. Install pole and aerial cable. 5. Recover redundant apparatus as necessary.
BT-04 (Temporary) (Advance Works) B1557602/CD/2721/009 to B1557602/CD/2721/020	Temporary diversion of apparatus between between Marlehall (approximate chainage 1960m) and Westwood (approximate chainage 3950m)	OG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and jointing chambers. 4. Install temporary cable.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works
TELECOMMUNICATIONS

Reference Drawing Reference	General Description of Services	UG, OH or OG	Works by Undertakers
BT-05 (Temporary) (Advance Works) B1557602/CD/2721/011 to B1557602/CD/2721/015	Temporary diversion to connect BT-04 (at approximate chainage 2635m) with existing BT Openreach overhead apparatus to the west of the A9 between Newmill and Woodside House.	OG / UG	1. Design works. 2. Procure apparatus. 3. Install ducts and jointing chambers. 4. Install temporary cable.
BT-06 B1557602/CD/2721/009 to B1557602/CD/2721/020	Provision of permanent apparatus between Marlehall (approximate chainage 1960m) and Westwood (approximate chainage 3950m), including a permanent feed to Newmill at approximate chainage 2630m.	UG	1. Design works. 2. Procure apparatus. 3. Install ducts and chambers. 4. Install cable. 5. Recover redundant apparatus as necessary.
BT-07 B1557602/CD/2721/009 to B1557602/CD/2721/013	Provision of permanent apparatus along the verge of the new Luncarty Link Road connecting into BT-08 to maintain connection with existing BT Openreach apparatus to the west of the A9.	UG	1. Design works. 2. Procure apparatus. 3. Install ducts and chambers. 4. Install cable. 5. Recover redundant apparatus as necessary.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works
TELECOMMUNICATIONS

Reference Drawing Reference	General Description of Services	UG, OH or OG	Works by Undertakers
BT-08 B1557602/CD/2721/012 to B1557602/CD/2721/017	Provision of permanent apparatus in the south verge of the new Tullybelton / Stanley Overbridge.	UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and chambers. 4. Install cable. 5. Recover redundant apparatus as necessary.
BT-09 (Existing) B1557602/CD/2721/020 to B1557602/CD/2721/023	Openreach to adjust existing chamber frames and cover to suit new verge levels. Protection measures required as necessary to safeguard existing apparatus from the construction of the New A9 and the associated Junction Slip Roads and Side Roads. Openreach to undertake any localised adjustments/slewing/protection of apparatus, as deemed to be required by Openreach.	UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install cable.
BT-10 B1557602/CD/2721/023 & B1557602/CD/2721/024	Provision of permanent apparatus across Bankfoot South Junction.	UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and chambers. 4. Lower and protect existing ducts where required. 5. Install cable. 6. Recover redundant apparatus as necessary.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works
TELECOMMUNICATIONS

Reference Drawing Reference	General Description of Services	UG, OH or OG	Works by Undertakers
BT-11 (Existing) B1557602/CD/2721/025 to B1557602/CD/2721/034	Openreach to adjust existing chamber frames and cover to suit new levels. Protection measures required as necessary to safeguard existing apparatus from the construction of the New A9 and the associated Junction Slip Roads and Side Roads. Openreach to undertake any localised adjustments/slewing/protection of apparatus, as deemed to be required by Openreach.	UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Replace Frame and Cover.
BT-12 (Temporary) B1557602/CD/2721/027	Temporary diversion to facilitate the reconstruction of the C408 side road (including footway).	UG / OH	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and chambers. 4. Install pole. 5. Install cable.
BT-13 B1557602/CD/2721/028	Provision of permanent apparatus in the C408 side road verge/footway.	UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and chambers. 4. Install cable. 5. Recover redundant apparatus as necessary.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works			
TELECOMMUNICATIONS			
Reference Drawing Reference	General Description of Services	UG, OH or OG	Works by Undertakers
BT-14 B1557602/CD/2721/029	Provision of permanent armoured diversion to avoid earthworks near Broompark.	UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and chambers. 4. Install cable. 5. Recover redundant apparatus as necessary.
BT-15	Not Used		
BT-16 B1557602/CD/2721/034 & B1557602/CD/2721/035	<p>Provision of permanent feed to the relocated CTIL communication mast situated east of the A9 at approximate chainage 7760m.</p> <p>The duct route feeding the existing mast will be abandoned following the installation of the new duct route to the new mast location and subsequent cable transfer.</p>	UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and chambers. 4. Install cable. 5. Recover redundant apparatus as necessary.
BT-17 (Existing) B1557602/CD/2721/035 to B1557602/CD/2721/043	<p>Lower/protect existing duct over new lay-by and adjust existing chamber frame and cover to suit new verge levels.</p> <p>Protection measures required as necessary to safeguard existing apparatus from the construction of the New A9 and the associated Junction Slip Roads and Side Roads. Openreach to undertake any localised diversions/slewing/adjustments of apparatus, as determined by Openreach to be possible/required.</p>	UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and protection.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works			
TELECOMMUNICATIONS			
Reference Drawing Reference	General Description of Services	UG, OH or OG	Works by Undertakers
BT-17A B1557602/CD/2721/034	Openreach to lay insurance duct between lowered chambers.	UG	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Install ducts and protection.
BT-18 B1557602/CD/2721/009	<p>Openreach to test existing 5 pair armoured cable to confirm if the cable is live.</p> <p>Openreach to divert cable away from proposed cut slope if required.</p>	UG	<ol style="list-style-type: none"> 1. Test existing cable/Design works. 2. Procure apparatus if required. 3. Install ducts and protection if required.

Notes

1. References BT-01 to BT-18 refer to those diversions and protection Works to BT Openreach services shown on Drawing Numbers B1557602/CD/2721/001 to B1557602/CD/2721/044 as listed in Appendix 0/4 of the Specification.
2. UG – Underground; OH – Overhead; OG – Overground; L and LHS – Left hand side; R and RHS – Right hand side.
3. The design, procurement, notification, and site works for BT-01 to BT-18 inclusive will, on occasions, take place concurrently.
4. Several of the cables require advance ordering of 10 weeks.
5. Please note that for Openreach Works outwith the Contractors traffic management or required to be done independently- then Roads Authority would be entitled to 3 months advance notice under the Transport (Scotland) Act for at least some of those works.
6. 3 months advance Road Authority Notice will be required for major Openreach duct works and Cabling works out with limits of proposed roadworks, and for any works required to be carried out in advance of start of main roadworks noticing/traffic management.
7. 8 weeks minimum advance notice for works within main Contractor's existing traffic management or non-traffic situations.
8. Please note that some temporary diversions may be placed OG and may not be buried. Where these diversions cross any temporary or permanent accesses, then cabling may require to be made UG.
9. Those diversions noted as being "Advance Works" have been instructed by the Employer in advance of the Contract. NRSWA notices for these are listed in Appendix E of the Employers Requirements.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works
ELECTRICITY – SCOTTISH AND SOUTHERN ENERGY

Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SSE-01 B1557602/2724/005 to B1557602/2724/006	11kV deviation at Ordie Mill, consisting of three spans of overhead line crossing the A9 and an underground tie in to existing SSE apparatus near Glenordie.	UG / OH	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Remove redundant apparatus and install new apparatus.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works ELECTRICITY – SCOTTISH AND SOUTHERN ENERGY			
Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SSE-02 B1557602/2724/007 & B1557602/2724/008	11kV deviation at Atholl Cottage, Luncarty, consisting of a newly positioned angle structure to facilitate the new A9 crossing.	OH	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Remove redundant apparatus and install new apparatus.
SSE-03 B1557602/2724/011	11kV deviation to facilitate the new A9 crossing at Strathord, Luncarty.	UG / OH	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Remove redundant apparatus and install new apparatus.
SSE-04 B1557602/2724/019	11kV alteration and Low Voltage alteration to facilitate the new A9 crossing at East Mains, Bankfoot.	UG / OH	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Remove redundant apparatus and install new apparatus.
SSE-05 B1557602/2724/022	Alteration to the existing 11kV pole arrangement at approximate chainage 4500m.	OH	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Remove redundant apparatus and install new apparatus.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works ELECTRICITY – SCOTTISH AND SOUTHERN ENERGY			
Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SSE-06 B1557602/2724/024	Protection measures required as necessary to safeguard existing apparatus from the construction of the B867. Any potential diversion measures at this location are dependent on the final scheme design.	UG	<ol style="list-style-type: none"> 1. Engage with Contractor to determine suitable safeguards for apparatus 2. Design works 3. Procure apparatus 4. Remove redundant apparatus and install new apparatus
SSE-07	Not Used		
SSE-08 B1557602/2724/030	Alteration to the existing 11kV pole arrangement at Broompark, Bankfoot, including a new tapping pole.	OH	<ol style="list-style-type: none"> 1. Design works. 2. Procure apparatus. 3. Remove redundant apparatus and install new apparatus.
SSE-09 B1557602/2724/017	Extension of existing 11Kv spur at Newmill, including alterations to existing pole spacings.	OH	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Remove redundant apparatus and install new apparatus
SSE-10	Not Used		

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works ELECTRICITY – SCOTTISH AND SOUTHERN ENERGY			
Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SSE-11 B1557602/2724/006	Protection measures required as necessary to safeguard existing apparatus from the construction of Pitlandie Retaining Wall.	UG	1. Engage with Contractor to determine suitable safeguards for apparatus.
SSE-12 B1557602/2724/009	Protection measures required as necessary to safeguard existing apparatus from the construction of the Luncarty Link Road. Any potential diversion measures at this location are dependent on the final scheme design.	UG	1. Design works 2. Procure apparatus 3. Engage with Contractor to determine suitable safeguards for apparatus 4. Remove redundant apparatus and install new apparatus
SSE-13	<u>Not Used</u>		
SSE-14 B1557602/2724/050	11kV deviation to the east of the access track at North Barns, Bankfoot.	OH	1. Design works 2. Procure apparatus 3. Remove redundant apparatus and install new apparatus

Notes

1. Reference SSE-01 to SSE-14 refer to those diversions and protection Works to Scottish and Southern Energy services shown on Drawing Numbers B1557602/2724/001 to B1557602/2724/051 as listed in Appendix 0/4 of the Specification.
2. UG – Underground; OH – Overhead; OG – Overground; L and LHS – Left hand side; R and RHS – Right hand side.
3. The design, procurement, notification, and site works for SSE-01 to SSE-14 will, on occasions, take place concurrently.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B – Indicative Schedule of Undertakers Works**GAS – SGN**

Drawing Reference	General Description of Services	UG, OH or OG	Works by Undertakers
B1557602/CD/2726/046 & B1557602/CD/2726/047	Concrete slab protection of existing SGN High Pressure pipeline at Gelly/Murthly access track. Slab design and any protection measures required to safeguard existing apparatus in the vicinity of the Gelly / Murthly access track to be designed and managed by the Contractor in accordance with SGN/SP/CE/12.	UG	<ol style="list-style-type: none"> 1. Supervision on site. 2. Engage with Contractor to determine suitable safeguards for apparatus. 3. Approve design and construction / installation methods. 4. Welds and joints to be inspected prior to slab installation.

Notes

1. Reference to those diversions and protection Works to SGN services shown on Drawing Numbers B1557602/2726/046 to B1557602/2726/047 as listed in Appendix 0/4 of the Specification.
2. UG – Underground; OH – Overhead; OG – Overground; L and LHS – Left hand side; R and RHS – Right hand side.
3. Protection slab installation to be undertaken as part of the Works by the Contractor.
4. Weld and joint inspections can only be undertaken during periods when demand is lower and pressure in the main can be reduced.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works**GAS – NATIONAL GRID**

Drawing Reference	General Description of Services	UG, OH or OG	Works by Undertakers
B1557602/CD/2723/009	<p>Existing National Grid High Pressure Gas main crosses under the A9.</p> <p>Protection measures (RC concrete slabs) required to safeguard existing apparatus in the vicinity of the Marlehall Farm, from the construction and operation of the Existing/New A9 and Luncarty Link Road and associated earthworks to be designed and installed by the Contractor.</p>	UG	<ol style="list-style-type: none"> 1. Supervision of works on site. 2. Engage with Contractor to determine suitable safeguards for apparatus. 3. Approve design and construction / installation methods. 4. Inspection of assets prior to the installation of any protection measures. 5. Undertake any adjustment/relocation of nitrogen fill/CP points and the pipeline marker systems.
B1557602/CD/2723/024	Existing National Grid High Pressure Gas main crosses under the A9.	UG	<ol style="list-style-type: none"> 1. Supervision of works on site.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

	<p>Protection measures (RC concrete slabs) required to safeguard existing apparatus in the vicinity of Bankfoot South Junction, from the construction and operation of the Existing/New A9 and the associated Junction Slip Roads and associated earthworks to be designed and installed by the Contractor.</p>		<ol style="list-style-type: none"> 2. Engage with Contractor to determine suitable safeguards for apparatus. 3. Approve design and construction / installation methods. 4. Inspection of assets prior to the installation of any protection measures. 5. Undertake any adjustment/relocation of nitrogen fill/CP points and the pipeline marker systems.
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Notes

1. Reference to those diversions and protection Works to National Grid services shown on Drawing Numbers B1557602/2723/009 and B1557602/2723/024 as listed in Appendix 0/4 of the Specification.
2. UG – Underground; OH – Overhead; OG – Overground; L and LHS – Left hand side; R and RHS – Right hand side.
3. Protection measure to be undertaken as part of the Works by the Contractor. Protection measures to be in accordance with T/CP/CE/12 and works in accordance with T/SP/SSW/22. National Grid procedure T/PM/G/35 will apply.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B – Indicative Schedule of Undertakers Works
COMMUNICATIONS – CTIL

Drawing Reference	General Description of Services	UG, OH or OG	Works by Undertakers
B1557602/CD/2727/035	Existing communications mast to be replaced in new location.	OG and UG	<ol style="list-style-type: none"> 1. Agree lease with Site Provider and proceed to legal completion. 2. Complete construction detailed design. 3. Source Distribution Network Operator (DNO) quote for new electrical supply. 4. Source quote for new transmission link. 5. Acquire client (Telefonica) approval for progression into the construction phase. 6. Place order for transmission link. 7. Place order for Distribution Network Operator power. 8. Manage construction phase. 9. Collate hand over pack content, review and submit for approval. 10. Update the client database throughout the acquisition, design and construction phases.

Notes

1. Reference to those diversions and protection Works to CTIL services shown on Drawing Numbers B1557602/2727/035 as listed in Appendix 0/4 of the Specification.
2. UG – Underground; OH – Overhead; OG – Overground; L and LHS – Left hand side; R and RHS – Right hand side.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B – Indicative Schedule of Undertakers Works**WATER – SCOTTISH WATER (SUPPLY)**

Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SWW 001 B1557602/2722/031	Diversion of 200mm diameter pipe at approximate chainage 7000m. Twin 400mm ducts to be laid through the embankment and under the proposed carriageway. 4 new valves to be placed at either end of the ducting. Air valve to the west to be removed. New air valve to be placed to west side. The two ducts will be at an offset of 5m from each other. To the east of the A9, the offset will be 3m, and to the west will be 4m.	UG	1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 002 B1557602/2722/031 & B1557602/2722/049	Diversion of 200mm diameter pipe at Coltrannie Overbridge (approximate chainage 6900m). New hydrant to be installed to the south, with the existing hydrant removed.	UG	1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works			
WATER – SCOTTISH WATER (SUPPLY)			
Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SWW 003 B1557602/2722/019	Diversion of 110mm diameter pipe at the East Mains link (to the south), to tie in with existing 4" AC.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 004 B1557602/2722/018	Diversion of 110mm diameter pipe north of the new Tullybelton / Stanley Junction. Twin 110mm water mains within 200mm ducts to be laid through the embankment and under the proposed carriageway.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 005 B1557602/2722/009 to B1557602/2722/018	Provision of 110mm diameter permanent pipe to be placed in NMU Facility of the Luncarty Link Road, continuing onto Tullybelton Road and onto Westwood access NMU Facility where it will tie-in with SWW 004.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 005 (Temporary) B1557602/2722/009 & B1557602/2722/010	Provision of 110mm diameter temporary pipe to be laid from the existing 4" AC main at approximately Ch-20 on the Luncarty Link Road (approx. mainline Ch1900) to existing 4" AC main at approximately mainline Ch2300. Hydrant to be removed at Ch. 180 on Luncarty Link Road.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works			
WATER – SCOTTISH WATER (SUPPLY)			
Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SWW 005 (Temporary) B1557602/2722/012 to B1557602/2722/018	Provision of 110mm diameter temporary pipe to be laid from existing 4" AC at approximate mainline Ch2700 to reconnect at approximate mainline Ch3200. Two hydrants to be removed along the existing apparatus.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 006 B1557602/2722/009 & B1557602/2722/010	Diversion of 300mm pipe to the east of Luncarty Link road (offset from the edge of earthworks). Fire hydrant and air valve to be removed. New hydrant and air valve to be installed.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 007 B1557602/2722/002	Diversion of 355mm diameter pipe to be laid to the east of the A9 between approximate chainages 0m and 150m.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus. 3. Install new apparatus; connect, test and commission as appropriate.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works			
WATER – SCOTTISH WATER (SUPPLY)			
Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SWW 007A (Existing) B1557602/2722/002 to B1557602/2722/005	Protection measures required as necessary to safeguard existing apparatus from the construction of the New A9 and the associated Junction Slip Roads.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 008 B1557602/2722/005	Provision of 90mm diameter permanent pipe to be laid in Pitlandie Bridge north verge. to tie in with new Hydrant to the west and existing hydrant to the east. Install air valve at high point (approx. Ch 300 of Overbridge).	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 008 (Temporary) B1557602/2722/005 & B1557602/2722/007	Provision of 90mm diameter temporary pipe to be laid along the existing access tracks to the east and west of the A9 at Ordie View.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 009 B1557602/2722/005 to B1557602/2722/008	Provision of 355mm diameter permanent pipe to be laid from south of the Pitlandie Overbridge to Ordie Burn (approximate chainage 1600m). T and valve to to be installed to facilitate a future water supply connection to Ordie View through Scottish Water connections department.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works			
WATER – SCOTTISH WATER (SUPPLY)			
Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SWW 009 (Temporary) B1557602/2722/005	Provision of 315mm diameter temporary pipe to be laid between south of Pitlandie overbridge and the Ordie Burn crossing.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 009A (Existing) B1557602/2722/008	Protection measures required as necessary to safeguard existing apparatus from the construction of the New A9 and the associated Junction Slip Roads.		<ol style="list-style-type: none"> 1. Engage with Contractor to determine suitable safeguards for apparatus.
SWW 010 (Temporary) B1557602/2722/008 & B1557602/2722/009	Provision of temporary pipes (280mm and 355mm diameter) to be laid to the east of the A9 mainline and connect into the SW mains at Luncarty TWP.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Remove redundant apparatus and install new apparatus; connect, test and commission as appropriate
SWW 010 B1557602/2722/008 & B1557602/2722/009	Provision of 355mm diameter permanent pipe to be laid in new NMU Facility and will tie in to the 355mm diameter pipe laid as part of the temporary diversion (all becoming permanent).	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works
WATER – SCOTTISH WATER (SUPPLY)

Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SWW 011 B1557602/2722/006	90mm diameter HPPE pipe to be laid and connected into the existing 75mm AC water main.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 012 B1557602/2722/006	110mm diameter HPPE pipe to be laid and connected into the existing 4" AC water main.	UG	<ol style="list-style-type: none"> 1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWW 013 (Existing) B1557602/2722/024	Protection measures required as necessary to safeguard existing apparatus from the construction of the New A9 and the associated Junction Slip Roads at Bankfoot South Junction. Protection measures may include the replacement of sections of pipe.	UG	<ol style="list-style-type: none"> 1. Engage with Contractor to determine suitable safeguards for apparatus.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES (Continued)

Table 1/16B –Indicative Schedule of Undertakers Works
WATER – SCOTTISH WATER (SEWER)

Contract Reference Drawing Reference	General Description of Services	UG or OH	Works by Undertakers
SWD 001 B1557602/2722/002 to B1557602/2722/004	Diversion of 250mm sewer to the east of the A9 mainline at Luncarty. Reconnects with existing apparatus near Shochie Burn. Two new under-pressure valves to be installed (one at each end of the diversion).	UG	1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate
SWD 002 B1557602/2722/024	Diversion of 225mm diameter sewer pipe at Bankfoot South Junction, including 2 new 1200mm manhole installations and 1 manhole to be re-built.	UG	1. Design works 2. Procure apparatus 3. Install new apparatus; connect, test and commission as appropriate

Notes

1. Reference SWW 001 to SWW 013 and SWD 001 to SWD 002 refers to those diversions and protection Works to Scottish Water services shown on Drawing Numbers B1557602/2722/001 to B1557602/2722/051 as listed in Appendix 0/4 of the Specification.
2. UG – Underground; OH – Overhead; OG – Overground; L and LHS – Left hand side; R and RHS – Right hand side.
3. The design, procurement, notification, and site works for SWW 001 to SWW 013 and SWD 001 to SWD 002 may, on occasions, take place concurrently.
4. Where cross-carriageway duct installation is requested by Scottish Water, this shall be undertaken as part of the Works by the Contractor, to a line and level agreed with Scottish Water.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT

1. All Traffic Management shall be carried out in a manner which avoids causing traffic to divert on to alternative routes, minimises the impact on the local community and minimises delays and disruptions to existing traffic. The Contractor shall demonstrate to the satisfaction of those consulted as given in Paragraph 3 of this Appendix that his Traffic Management proposals have been developed such that they include all necessary measures to minimise delays, disruptions and diversions to traffic.
2. Subject to the other requirements of the Contract the Contractor shall comply at all times with the requirements of Chapter 8 of the Traffic Signs Manual and any additional requirements detailed in the Design Manual for Roads and Bridges.
3. Notwithstanding any requirement of the Contract, the Contractor shall liaise with Perth and Kinross Council, the Traffic Police and the Overseeing Organisation on all temporary traffic management proposals and shall obtain Consultation Certificates signed by the Contractor and the relevant third parties in accordance with Section 8.9 of the Employer's Requirements.

Liaison shall be through the following offices:

Police Scotland

Road Policing, Operational Planning and Support

Contact: [REDACTED]

Email: [REDACTED]

Telephone Number: [REDACTED]

Local Road Network

Perth & Kinross Council

Address: [REDACTED]

Contact: [REDACTED]

Email: [REDACTED]

Telephone Number: [REDACTED]

Trunk Road

Network Management Trunk Roads and Bus Operations (TRBO)

[REDACTED]

Contact: [REDACTED]

Telephone Number: [REDACTED]

Trunk Roads Managed and Maintained by:

BEAR Scotland Limited

[REDACTED]

Contact: [REDACTED]

Email: [REDACTED]

4. Jenoptik are employed by Transport Scotland and will provide a 'mobile' Average Speed Camera (ASC) for the Works. This mobile system comprises of a minimum of two camera stations within the extent of the works and Jenoptik will locate/relocate this equipment while the Works are ongoing. The Contractor will be required to liaise with Jenoptik and Police Scotland to agree and provide a suitable location including a power supply for the camera stations and traffic management for:

- (i) Installation of temporary average speed cameras;

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)
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- (ii) Initial calibration of temporary average speed cameras;
- (iii) Removal of temporary average speed cameras;
- (iv) Relocation of temporary average speed cameras as part of construction requirements; and
- (v) Re-calibration required as a result of any relocation.

The Contractor shall inform of any changes to the traffic management layout which will impact on the operation of the ASC.

5. Where Works are carried out on or adjacent to a road open to vehicles, all vehicles and mobile plant operating on or adjacent to that road in the execution of the Works shall be painted in a conspicuous colour as described hereafter :-

- (i) All vehicles used in mobile lane closures as defined in Section D6.24 of Part 1 of Chapter 8 of the Traffic Signs Manual shall be painted in non-reflectorised yellow (Colour No 355 to BS 381 C or similar).

Similarly all vehicles engaged in Works within unprotected trafficked lanes (for example, setting up major traffic management layouts such as tapers and contraflows) on high speed roads shall be painted non-reflectorised yellow.

- (ii) All other vehicles undertaking Works shall be generally light in colour preferably but not necessarily non-reflectorised yellow and/or provide, over the full width and height of the vehicle which is exposed to approaching vehicles, conspicuous markings and signs to define clearly that the vehicle is a roadworks vehicle.
- (iii) Vehicles shall have a sign board reading "Highway Maintenance" (to Diagram 7404 of Schedule 13 Part 6 of the Traffic Signs Regulations and General Directions 2016) fixed at the rear.

The lettering shall be 150 millimetres "x height" except that for light vans and cars it shall be the largest "x height" that can be accommodated out of the following heights: 37.5, 50, 62.5 or 100 millimetres.

The lettering shall be black capital letters from the alphabet as described in Schedule 17 Part 2 of the Traffic Signs Regulations and General Directions 2016 on a yellow non-reflectorised background in accordance with BS 381C, Colour No 355.

In addition all purpose vehicles and plant shall be provided with either roof mounted light bars or at least two amber flashing beacons, and light vans and cars shall be provided with a roof mounted amber flashing distinctive lamp.

- (iv) All warning lamps shall be switched on when the vehicle or plant is manoeuvring into or out of the location of the Works, operating at low speed on the carriageway or hard shoulder open to vehicles or standing on a carriageway or hard shoulder open to vehicles.

6. Proposals for the management of all vehicular and pedestrian traffic shall be submitted to the Overseeing Organisation prior to the commencement of any Works.

7. All applications relating to Traffic Orders and/or authorisation of signs and/or signals shall be submitted to the Overseeing Organisation and Local Authority in writing and require the following notice following payment in accordance with clause 8 below:

- (i) amending or making temporary traffic orders – 8 weeks;
- (ii) authorisation of temporary traffic signals – 3 weeks; and
- (iii) authorisation of non prescribed signs – 8 weeks.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)
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8. The Contractor shall be responsible for the payment of all charges associated with the preparation and publication of all road related orders.
9. The Contractor shall comply with Section 8.11.7 of Part 1 of the Employer's Requirements in relation to the provision of Stage 2 and Stage 3 Road Safety Audits on all temporary traffic management proposals.
 - (i) Prior to any Works starting on Site, the Contractor shall supply to the Overseeing Organisation details of the following: Phasing of the Works
 - (ii) Drawings showing traffic management layouts including, but not limited to, the following:
 - a) Position of traffic signs, signals and cores
 - b) Width of lanes
 - c) Working areas
 - d) Safety zones
 - e) Details of temporary barriers for the protection of personnel
 - f) Entry points for site traffic
 - g) Provisions for emergency vehicles
 - h) Crossovers (suitable for moving traffic at a design speed of 70kph)
 - (iii) Timing of operations
 - (iv) Sufficient information to demonstrate the objectives stated in paragraph 1 of this Appendix 1/17 can be achieved
 - (v) Name and telephone numbers of the Traffic Safety and Control Officer and other personnel
 - (vi) Names and telephone numbers of a minimum of 3 personnel who can be contacted by Police Scotland and/or Overseeing Organisation, both during or outwith the working day, and who shall be responsible for initiating whatever action shall reasonably be required in the event of an emergency. At least 2 of these contacts shall be available at any one time including periods when the Site is closed.

Notwithstanding the difficulties associated with mobile telephone coverage in this area, all of the above shall be provided with a communications system sufficient to allow contact to be achieved at all times with coverage extending to the Site and the A9 Trunk Road.
10. Not less than 10 days before implementation of any temporary traffic management proposals the Contractor shall submit to the Overseeing Organisation the two signed copies of a Stage 2 Road Safety Audit Certificate in respect of the temporary traffic management proposals.
11. Not less than 7 days before implementation of any temporary traffic management proposals the Contractor shall submit to the Overseeing Organisation the following:
 - (i) Two signed copies of Consultation Certificates in respect of the temporary traffic management proposals signed by the Contractor and Police Scotland.
 - (ii) Two signed copies of Consultation Certificates in respect of the temporary traffic management proposals signed by the Contractor, Perth and Kinross Council, and Overseeing Organisation.
 - (iv) Four copies of drawings showing the temporary traffic management proposals layouts including, as appropriate:

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)
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- Position of traffic signs, signals and cones
 - Width of lanes
 - Working areas
 - Safety zones
 - Details of temporary barriers for the protection of personnel
 - Entry points for site traffic
 - Provisions for emergency vehicles
 - (v) Crossovers (suitable for moving traffic at a design speed of 70kph)
 - (vi) Details of any relevant correspondence between the Contractor and Police Scotland and the Contractor and Perth and Kinross Council.
12. The erection and removal of any traffic management installation or temporary diversion and Stage 3 Road Safety Audit shall not be carried out during the following hours and at any other time periods specified by the Overseeing Organisation:-
- Monday to Saturday – 06:30 to 09:30 hours inclusive and 15.30 to 19.30 hours inclusive and on any local or national public holiday.
13. For construction of the new roadworks on the Existing A9 Trunk Road, temporary Traffic Regulation Orders, which shall allow mandatory speed restrictions shall be implemented.
- The Contractor shall provide and maintain all necessary temporary signing with regard to the Orders.
14. Temporary crossovers shall be designed for a Design speed (85 percentile speed) of 70kph.
15. "Merge in turn" layout. NOT USED.
16. Notwithstanding any other requirements of the Contract, safety zones at all temporary traffic management proposals on the Site shall be provided as per the requirements of Chapter 8 of the Traffic Signs Manual.
17. The Contractor shall not take down existing local or advance direction signs or regulatory or informatory signs without first either providing temporary signs displaying the same information or replacement permanent signs.
18. The Contractor shall ensure that while any temporary traffic management proposals are in force they are constantly monitored, any defects identified being rectified immediately to the satisfaction of the Overseeing Organisation, Police Scotland and Perth and Kinross Council.
19. The Contractor shall keep a daily record of all defects in any temporary traffic management proposals, the times when they were identified or reported to him, the action taken to correct the defects, and the times when they were successfully corrected.
- A copy of this record shall be forwarded to the Overseeing Organisation on the following day.
20. In the event of a traffic accident occurring in or adjacent to any of the Works, the Contractor shall immediately contact the Trunk Road Operator, Police Scotland, Fire and Ambulance emergency services as appropriate and the Overseeing Organisation informing them of the following:
- (i) Location of the accident; and
 - (ii) The seriousness of the accident and whether any persons are trapped; whether the collision involves vehicles carrying inflammable, corrosive or hazardous substances; whether there is a possibility of ignition from leaking fuel or chemicals.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)
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21. All drivers including those delivering Constructional Plant and materials shall be given clear instructions regarding the traffic arrangements applicable at any particular time.
22. Provision for the passage of abnormal loads through the Works shall be as follows:
 - (i) The Contractor shall assist Police Scotland in moving abnormal loads through the Works by modifying the signing/coning as necessary.
Signs/cones so moved shall be replaced immediately the abnormal loads have passed through the Works.
 - (ii) The Contractor shall be responsible for the provision of holding lay-bys for abnormal loads on the A9 Trunk Road to the north and south of the Works, including appropriate signing.
Police Scotland and the relevant Roads Authority shall be consulted with regard to the use of existing lay-bys for this purpose.
 - (iii) The Contractor shall not be entitled to any further payment by the Overseeing Organisation in respect of the provisions made, measures taken or disruption caused by such abnormal loads.

For the purposes of this Section an abnormal load shall consist of any number of vehicles in convoy at any one time, requiring special measures to be taken in order to gain passage through the Works.

23. The Contractor shall be responsible for maintaining the running carriageway adjacent to and within the Works in a clean and safe condition at all times.
24. Heavy Goods Vehicles used on Site by the Contractor, his sub-contractors or suppliers shall be fitted with an audible reversing warning device.
25. Meetings between the Overseeing Organisation, Contractor, Police Scotland and Perth and Kinross Council shall be arranged by the Contractor monthly throughout the duration of the Works, at initiation or changes of traffic management layouts and at any other time deemed necessary by any of these parties. A record of this meeting shall be forwarded to the Engineer within seven days.
26. The Contractor shall ensure that his traffic management proposals take account of events and public holidays that are likely to affect traffic flows.
27. The Contractor shall accommodate roadwork schemes adjacent to the Works and shall consult and comply with the relevant Roads Authority in this respect.
28. The Contractor shall nominate two members of staff to liaise with the Traffic Scotland National Control Centre at all times. As part of the nomination information the Contractor shall provide 24 hour contact telephone numbers for the staff.
29. The contact address is: [REDACTED]. Telephone: [REDACTED].
30. The Contractor shall notify the National Control Centre, BEAR Scotland, Perth and Kinross Council and the emergency services at least two weeks in advance of the initial implementation of any Temporary Traffic Management and any planned major changes to the traffic management layouts. The Contractor shall provide at the time of each notification an indication of the delays that are likely to occur.
31. In accordance with Appendix 1/24 of the Specification the Contractor shall within his Method Statements for Traffic Management include procedures to inform the motoring public of delays and queues on the approaches to and within the site.
32. The following organisations are to be informed of the frequencies indicated in clause 34 below:

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)

- (i) Traffic Scotland Operations & Infrastructure Services (TSOIS) Contractor
Telephone: [REDACTED]

33. Traffic queues shall be monitored by the Contractor at all times during periods when temporary traffic management systems are in operation for the duration of the Contract.
34. Traffic queues shall be measured by means of time delay. Queue lengths measured as being less than eight minutes shall be defined as representing “No substantial delay”.

Substantial delay queue lengths shall be quoted in the following bands;

<u>Measured Delay</u>	<u>Quoted Delay</u>
Up to 8 minutes	No substantial delay
Between 8 and 12 minutes	10 minute delay
Between 13 and 17 minutes	15 minute delay
Between 18 and 22 minutes	20 minute delay
subsequent 5 minute time bands	add 5 minute delay

When communicating a traffic queue its length is to also be quoted as a distance in miles.

For the purposes of the Contract a queue is defined as being where the speed of vehicles is less than 20 miles per hour.

Reporting Frequencies

The traffic information points of contact listed in clause 32 shall be informed by the Contractor if;

- (i) A queue reaches eight minutes delay;
- (ii) A queue changes by five minute band; or
- (iii) Substantial delay ends i.e. delay less than eight minutes.

The Contractor shall report to TSNCC every 30 minutes when there is a queue as defined in this clause.

35. Vehicular and pedestrian access to any private premises shall not be restricted by the Works without the express prior written approval of the owner/occupier of the private premises.
36. The Contractor shall provide to the Overseeing Organisation evidence of any such written approval in advance of a restriction taking place.
37. Not used.
38. Not used
39. All traffic signs required by the Traffic Signs Regulations and General Directions 2016 that are to be reflective shall be made reflective by the application of Class 1 retroreflective material.
40. As a minimum provision the traffic management arrangements must ensure that a single lane width of at least 3.25m is available at all times.
41. All temporary traffic signs must comply with the Traffic Signs Regulations and General Directions 2016.
42. Public Roads, Private Roads and Other Ways Affected by the Works
The following public roads are under the control of Transport Scotland:-

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)

Description	Predicted 24 Hour Annual Average Daily Flow AADF and %age HGV	Estimated Eighty Five Percentile Speed of Cars (mph)	Speed Limit (mph) if Proposed	Type(s) of Traffic Control	Special facilities (pedestrian equestrian)	Whether to be Kept Open or Closed
A9 Trunk Road	17,100 – 13,400 with 11-13% HGV (2019 data)	60	Contractor's Traffic Management proposals	Contractor's Traffic Management proposals	Where any special facility exists it shall be maintained	Open

The following public roads are under the control of Perth and Kinross Council:-

Description	Predicted 24 Hour Annual Average Daily Flow AADF	Estimated Eighty Five Percentile Speed of Cars (mph)	Speed Limit (mph) if Proposed	Type(s) of Traffic Control	Special facilities (pedestrian equestrian)	Whether to be Kept Open or Closed
B9099 Luncarty	10,200 with 3% HGV (2019 data)	30	Contractor's Traffic Management proposals	Contractor's Traffic Management proposals	Where any special facility exists it shall be maintained	Open
B8063 Redgorton	1,900 with 4% HGV (2019 data)	60	Contractor's Traffic Management proposals	Contractor's Traffic Management proposals	Where any special facility exists it shall be maintained	Open
U32 Tullybelton	400 with 8% HGV (2019 data)	60	Contractor's Traffic Management proposals	Contractor's Traffic Management proposals	Where any special facility exists it shall be maintained	Open
U38 Stanley	600 with 5% HGV (2019 data)	60	Contractor's Traffic Management proposals	Contractor's Traffic Management proposals	Where any special facility exists it shall be maintained	Open
Luncarty Link Road	300 with 5% HGV (2019 data)	60	Contractor's Traffic Management proposals	Contractor's Traffic Management proposals	Where any special facility exists it shall be maintained	Open
B867 (S) (North of Bankfoot NB Junction)	1,800 with 5% HGV (2019 data)	60	Contractor's Traffic Management proposals	Contractor's Traffic Management proposals	Where any special facility exists it shall be maintained	Open
Unclassified Road (South of Bankfoot SB Junction)	1,800 with 3% HGV (2019 data)	60	Contractor's Traffic Management proposals	Contractor's Traffic Management proposals	Where any special facility exists it shall be maintained	Open
B867 (N) (North of Bankfoot NB Junction)	900 with 7% HGV (2019 data)	60	Contractor's Traffic Management proposals	Contractor's Traffic Management proposals	Where any special facility exists it shall be maintained	Open
Perth Road	1,600 with 4% HGV (2019 data)	60	Contractor's Traffic Management proposals	Contractor's Traffic Management proposals	Where any special facility exists it shall be maintained	Open

44. (i) In addition to the minimum requirements for signing and coning under Chapter 8 of the Traffic Signs Manual the Contractor shall erect and maintain the following:

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)
--

- (a) Advanced signing two miles prior to roadworks as drawing No. (P7004 sheet 1 of 3) detailing modification to sign WBM 338.1 of Chapter 8 of the Traffic Signs Manual.

The standard two-line legend "Road Repairs" shall be replaced by "Major Roadworks".

- (b) Signing erected one mile in advance of roadworks as drawing No (P) 7005 detailing modification to sign WBM 338 of Chapter 8 of the Traffic Signs Manual.

The standard two line legend shall read "Delays Possible" and a third line added to the legend indicating how long delays are possible.

At the commencement of the Contract, the additional line shall read, for example "until July 2012".

At least ten working days before the end of the carriageway restrictions, the date shall be specified more precisely, for example "until 25 June 2012".

This date shall be further revised if necessary, until the restrictions are removed.

- (ii) Only the following abbreviations shall be used: Jan, Feb, Mar, Apr, Aug, Sep, Oct, Nov and Dec.

- (iii) Not used.

- (iv) Signing to Drawing Numbers W(S) 148 and W(S) 149 shall be deposited in accordance with signs WBM 339.1 and WBM 339 respectively under Chapter 8 of the Traffic Signs Manual.

- (iv) Where within all of the drawings listed above reference is made to "The Scottish Office", it shall be deleted and replaced with "Transport Scotland" and the logo amended accordingly.

- (vi) Black on yellow signs as Drawing Numbers [(P) 7004 sheet 2 of 3] and [(P) 7004 sheet 3 of 3] sited at the beginning and at 1 kilometre intervals through the Works to explain why part of the road has been coned off but no Works is, or appears to be taking place.

This signing shall comprise a frame on to which signs displaying any one of the approved messages below shall be fitted.

This equipment shall either be permanently sited, for the duration of the Works, where it is safe and convenient to do so, or kept on one side ready for display when it is required.

The signs shall be constructed and mounted in accordance with the general principles outlined in Chapter 8 of the Traffic Signs Manual.

They shall be reflectorised by the use of Class1 retroreflective material.

- (vii) The legends required to the Works shall follow the following variants in accordance with Chapter 8 of the Traffic Signs Manual:

REPLACING DAMAGED BRIDGE SUPPORTS

WORK SUSPENDED UNSUITABLE WEATHER

REPAIR WORK ON BRIDGE BELOW

LANE CLOSED TO PROTECT WORKFORCE

- (viii) The minimum period of inactivity which would warrant the display of a sign is 15 minutes.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)
--

45. (i) The contractor shall appoint a suitably experienced and qualified Traffic Safety and Control Officer ("TSCO") and nominated deputies as necessary in accordance with Sub-Clause 117 of SHW Series 100. In addition to those set out in Sub-Clause 117 of SHW Series 100, the responsibilities of the TSCO and of his nominated deputies shall include, without limitation, the following matters:
- (a) ensuring that, within 30 minutes of notification of the occurrence of an incident, as defined below, resulting in stationary vehicle(s) on a road open to the public, the driver is facilitated with contact details for suitably qualified local recovery services and that BEAR Scotland as Operating Company is notified of the incident;
 - (b) recording and logging all incidents. For the purposes of this Appendix, an "incident" is defined as a shed load, vehicle breakdown, vehicle abandonment or traffic accident, whether or not the latter involves personal injury;
 - (c) liaising with Traffic Scotland on matters that affect the traffic flow;
 - (d) all traffic management measures associated with the Works;
 - (e) ensuring that all traffic management equipment is in place and in full working order at all times;
 - (f) enforcement of all relevant Health and Safety directives, relating to traffic management operations and live traffic;
 - (g) enforcement of site access requirements; and
 - (h) arranging maintenance patrols of the TTMS whenever traffic management is present on the A9.
- (ii) The Contractor shall notify the Employer and any relevant authority with the name and 24 hour contact telephone number of the TSCO and his deputies appointed prior to any Works commencing on site.
46. (i) During any period when traffic restrictions are imposed on the A9, the Contractor shall nominate a minimum of two responsible and appropriately experienced operatives with access to an appropriate vehicle on a 24 hour day, 7 days a week basis whose responsibility shall include the operational supervision and monitoring of the TTMS. As a minimum the two operatives will review the TTMS prior to works beginning each day and at intervals no greater than 4 hours while TTMS is in operation.
- (ii) The operatives shall be equipped with a mobile cellular telephone to enable direct communication with them at all times. They shall be empowered to accept instructions from the Employer, the police and personnel from other relevant authorities with regard to the layout of the TTMS for which they are responsible. The Contractor shall notify the Employer and any relevant authority with the name and 24 hour contact telephone number of the operatives prior to any Works commencing on site.

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APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)



Scheme Ref.			
Sign Ref.	Road Works Sign 1	x-height	125.0
Letter colour	BLACK	SIGN FACE	
Background	YELLOW	Width	2790mm
Border	BLACK	Height	1830mm
Material	Microprismatic	Area	5.10sq.m

Notes:

1. Traffic signs to be manufactured in accordance with BS EN 12899-1:2007 in the case of Class B signs, or BS 6808:2005 in the case of microprismatic signs.
2. All dimensions are in millimeters unless otherwise stated.
3. Lengths, widths and spacings of route numbers, legends, stocks and borders shall be in accordance with the Traffic Signs Manual Chapter 8 and the Working Drawings for Traffic Sign Design and Manufacture Volume 1, 2 and 3.
4. The actual location of traffic signs shall be agreed with the Engineer prior to commencement.
5. The legend is from the Transport Heavy Alphabet of the x-height shown.
6. For guidance on the use and size of the Transport Scotland logo refer to the Motorway, Trunk Road Guidelines.

REVISIONS

July 2010

Not to scale

DESCRIPTION OF WORKS

TRANSPORT SCOTLAND

— an operating company of —

(P) 004 Sheet 1 of 3

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)



Scheme Ref.			
Sign	Ref. Road Works Sign 2	x-height	100-125
Letter colour	BLACK	SIGN FACE	
Background	YELLOW	Width	—
Border	BLACK	Height	—
Material	Microprismatic	Area	—



Scheme Ref.			
Sign	Ref. Road Works Sign 3	x-height	100-125
Letter colour	BLACK	SIGN FACE	
Background	YELLOW	Width	—
Border	BLACK	Height	—
Material	Microprismatic	Area	—

Notes:

1. Traffic signs to be manufactured in accordance with BS EN 12899-1:2007 in the case of Class RA signs, or BS 6808:2005 in the case of microprismatic signs.
2. All dimensions are in millimeters unless otherwise stated.
3. Lengths, widths and spacings of route numbers, legends, blocks and borders shall be in accordance with the Traffic Signs Manual Chapter 8 and the Working Drawings for Traffic Sign Design and Manufacture Volume 1, 2 and 3.
4. The actual location of traffic signs shall be agreed with the Engineer prior to commencement.
5. The legend is from the Transport Heavy alphabet of the x-heights shown.
6. For guidance on the use and size of the Transport Scotland logo refer to the 'Motorway, Trunk Road Guidelines'.

REVISIONS
DESCRIPTION OF WORKS

(F) 7004 Sheet 2 of 3

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)



Scheme Ref.		
Sign Ref.	Road Works Sign 4	x-height 100–125
Letter colour	BLACK	SIGN FACE
Background	YELLOW	Width –
Border	BLACK	Height –
Material	Microprismatic	Area –



Scheme Ref.		
Sign Ref.	Road Works Sign 5	x-height 100–125
Letter colour	BLACK	SIGN FACE
Background	YELLOW	Width –
Border	BLACK	Height –
Material	Microprismatic	Area –



Scheme Ref.		
Sign Ref.	Road Works Sign 6	x-height 100–125
Letter colour	BLACK	SIGN FACE
Background	YELLOW	Width –
Border	BLACK	Height –
Material	Microprismatic	Area –

Notes:

1. Traffic signs to be manufactured in accordance with BS EN 12899-1:2007 in the case of Class RA signs, or BS EN 12899-2:2005 in the case of microprismatic signs.
2. All dimensions are in millimeters unless otherwise stated.
3. Lengths, widths and spacings of route numbers, legends, blocks and borders shall be in accordance with the Traffic Signs Manual Chapter 8 and the Working Drawings for Traffic Sign Design and Manufacture Volume 1, 2 and 3.
4. The actual location of traffic signs shall be agreed with the Engineer prior to commencement.
5. The legend is from the Transport Heavy alphabet at the x-heights shown.
6. For guidance on the use and size of the Transport Scotland logo refer to the 'Motorway, Trunk Road Guidelines'.

REVISIONS

100 July 2010

101 Not to Scale

DESCRIPTION OF WORKS



(P) 7004 Sheet 3 of 3

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)



Scheme Ref.		
Sign Ref.	Road Roads Sign 7	x-height 125.0
Letter colour	BLACK	SIGN FACE
Background	YELLOW	Width 2585mm
Border	BLACK	Height 1830mm
Material	Microprismatic	Area 4.72sq.m

Notes:

1. Traffic signs to be manufactured in accordance with BS EN 12899-1:2007 in the case of Class RA signs, or BS 6808:2005 in the case of microprismatic signs.
2. All dimensions are in millimeters unless otherwise stated.
3. Lengths, widths and spacings of route numbers, legends, blocks and borders shall be in accordance with the Traffic Signs Manual Chapter 8 and the Working Drawings for Traffic Sign Design and Manufacture Volume 1, 2 and 3.
4. The actual location of traffic signs shall be agreed with the Engineer prior to commencement.
5. The legend is from the Transport Heavy alphabet of the x-heights above.
6. For guidance on the use and size of the Transport Scotland logo refer to the 'Motorway, Trunk Road Guidelines'.

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July 2010
Not to Scale

DELAY AND
DISTANCE TO WORKS

TRANSPORT SCOTLAND

(P) 7005

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)



Scheme Ref.		
Sign Ref.	Road Works Sign 8	x-height 125.0
Letter colour	BLACK	SIGN FACE
Background	YELLOW	Width 3180mm
Border	BLACK	Height 2325mm
Material	Microprismatic	Area 7.40sq.m

Notes:

1. Traffic signs to be manufactured in accordance with BS EN 12899-1:2007 in the case of Class RA signs, or BS EN 12899-2:2005 in the case of microprismatic signs.
2. All dimensions are in millimeters unless otherwise stated.
3. Lengths, widths and spacings of route numbers, legends, blocks and borders shall be in accordance with the Traffic Signs Manual Chapter 8 and the Working Drawings for Traffic Sign Design and Manufacture Volume 1, 2 and 3.
4. The actual location of traffic signs shall be agreed with the Engineer prior to commencement.
5. The legend is from the Transport Heavy Alphabet of the x-heights shown.
6. For guidance on the use and size of the Transport Scotland logo refer to the 'Motorway, Trunk Road Guidelines'.

REVISIONS

001	July 2010	
002	Not to Scale	
003	WORK STARTS HERE DELAYS POSSIBLE	
	TRANSPORT SCOTLAND	
004	W(S) 148	

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (Continued)



Scheme Ref.		
Sign Ref.	Road Sign X	x-height 125.0
Letter colour	BLACK	SIGN FACE
Background	YELLOW	Width 2915mm
Border	BLACK	Height 1830mm
Material	Microprismatic	Area 5.33sq.m

- Notes:
1. Traffic signs to be manufactured in accordance with BS EN 12899-1:2007 in the case of Class RA signs, or BS 8406:2005 in the case of microprismatic signs.
 2. All dimensions are in millimeters unless otherwise stated.
 3. Lengths, widths and spacings of route numbers, legends, blocks and borders shall be in accordance with the Traffic Signs Manual Chapter 8 and the Working Drawings for Traffic Sign Design and Manufacture Volume 1, 2 and 3.
 4. The actual location of traffic signs shall be agreed with the Engineer prior to commencement.
 5. The legend is from the Transport Heavy alphabet at the x-heights shown.
 6. For guidance on the use and size of the Transport Scotland logo refer to the Motorway, Trunk Road Guidelines.

REVISIONS	
100	July 2010
101	Not to Scale
102	SORRY FOR ANY DELAY
W(S) 149	

APPENDIX 1/18: TEMPORARY HIGHWAYS FOR TRAFFIC

1. Safe access across the Works shall be maintained or diversions provided in accordance with the minimum standards shown in Tables A and B to this Appendix.
2. The Contractor shall provide and maintain access to all properties adjacent to the Works. Temporary diversions shall be maintained at all times.
3. The Contractor shall make all necessary arrangements with owners and occupiers of any land in addition to that provided in the Contract, which is temporarily required for the diversion of traffic.
4. The Contractor shall submit for approval to the Overseeing Organisation and Local Authority, his detailed proposals as below for the temporary diversion of traffic (including pedestrian routes) at least 6 weeks prior to the implementation date:
 - (i) Phasing of the Works
 - (ii) Drawings showing traffic management layouts including as follows:
 1. Position of traffic signs and signals;
 2. Width of Lanes;
 3. Working areas;
 4. Safety zones;
 5. Entry points for site vehicles, etc; and
 6. Signing.
 - (iii) Making or amending traffic orders

The Contractor shall be responsible for the payment of all charges associated with the preparation and publication of all road related orders.
5. The Contractor shall give the Overseeing Organisation at least 14 days written notice of any phased Works which require Lane or Carriageway Occupations, and shall not alter or adjust the traffic until the Overseeing Organisation has acknowledged receipt of the relevant Consultation Certificate.
6. The standard of construction and lighting of diversions shall be suitable in all respects for the class or classes of traffic using the existing carriageways. Any temporary diversion of a road shall have a bituminous or asphaltic surface.
7. All access provision shall be to a standard equivalent to that in place upon commencement of the Works.
8. Temporary diversions shall be designed in accordance with the Design Manual for Roads and Bridges to a Design speed of 70kph.

Any temporary diversions of Slip Roads and side roads shall be designed to a design speed of 50kph.
9. Table B gives minimum standards for diversions of traffic.

The standards shall be used to Design temporary diversions of traffic for the road or way in question should it not be possible to maintain the required width on the existing carriageway.
10. Stage 2 and Stage 3 Road Safety Audits shall be carried out on all temporary traffic management proposals as described in Appendix 1/17 of this Specification.

APPENDIX 1/18: TEMPORARY DIVERSIONS FOR TRAFFIC (Continued)

11. Notwithstanding any other requirements of the Contract any generator required for powering temporary traffic lights shall not be permitted within 100 metres of any occupied property.

Table A: Requirements of the Overseeing Organisation in the Execution of Temporary Diversions necessitated by the Works.

Description	Requirement (Clause 118.2 or Amendment)	Remarks
Existing A9 Trunk Road	<p>Full closure of the A9 trunk road shall only be permitted by the Overseeing Organisation on limited occasions where the Contractor can satisfy the Overseeing Organisation that there are no viable alternatives.</p> <p>Two way running to be maintained at all times, with minimum 3.25m wide lanes.</p> <p>Traffic control by means of traffic signals will be subject to the agreement of BEAR Scotland and with the written approval of the Engineer.</p> <p>Any Works requiring traffic control shall incorporate a minimum mandatory speed limit of not less than 30 mph.</p> <p>Not more than one set of signals shall be permitted in connection with the Works.</p>	
Existing Side Roads	<p>Traffic diversions using Perth Road, Stanley shall not be permitted for HGVs.</p> <p>Traffic diversions using the B867 (at Railway underbridge) shall not be permitted for HGVs.</p>	
Non-Motorised User Facilities	<p>Temporary diversions of Non-Motorised Users facilities shall be agreed with Perth and Kinross Council.</p>	

APPENDIX 1/18: TEMPORARY DIVERSIONS FOR TRAFFIC (Continued)

Table B: Schedule of Standards for Temporary Diversion of Traffic

Route	Parameter	Minimum standard
A9 Trunk Road	General	Subject to the requirements of Chapter 8 of the Traffic Signs Manual.
	Temporary running surface on carriageway widening	The standard of construction of diversions shall be suitable in all respects for the class or classes of traffic using the existing carriageways. Any temporary diversion of a road shall have a bituminous or asphaltic surface. All temporary diversions shall be maintained at all times. Gradients shall not be greater than 6 per cent (except where otherwise agreed by the Overseeing Organisation).
Side Roads	Traffic diversions using the B867 (at Railway underbridge) and Perth Road, Stanley shall not be permitted for HGVs.	
Non-Motorised User Facility	Construction Maximum gradient Crossfall Minimum width	75mm type 1 sub-base to Clause 803 8% 2.5% 1.2metres

APPENDIX 1/19: ROUTEING OF VEHICLES

1. The Contractor shall submit his proposals for Site access points including access to offices and the like, at least two weeks in advance of the proposed start date for construction.
2. Access to the Site shall be taken at the following Points only:
 - (i) The existing A9 Trunk Road

Any other existing public and private roads including footways, farm and house accesses shall only be used by the Contractor with the prior agreement of the owner, the Overseeing Organisation or Perth and Kinross Council, as appropriate. Any such roads or access used by vehicles engaged in the Works or any new roads which are part of the Works and which are used by traffic shall be kept clean of dirt, mud or other materials dropped by said vehicles at all times. The Contractor shall provide, maintain and keep available at all times equipment as may be necessary to keep such ways clean.
3. Bulk Haulage of material excavated within the Site shall be carried out on haul roads within the Site wherever possible.

The use of public roads for this operation shall only be permitted subject to consultation with Transport Scotland or Perth and Kinross Council, as appropriate, notwithstanding at grade crossings of public roads, which may be permitted subject to the Contractor submitting satisfactory traffic management proposals to the Overseeing Organisation.

Sufficient information, including details of the frequency of plant crossing, loads and working period of crossings shall be supplied to the Overseeing Organisation to enable the Overseeing Organisation to consider the proposal.

The Contractor shall minimise delays to traffic due to right turning access to the site.
4. If the proposed method of construction involves the use of any part of the permanent works by construction traffic or plant, the Contractor shall in accordance with Clause 14(3) of the Conditions of Contract and at least one week before he intends to use the Permanent Works, submit to the Overseeing Organisation sufficient information as to enable the Overseeing Organisation to consider the proposal.

Such information should include details of location, plant, applied loads, frequency of loading, duration, calculations of stresses strains deflections and other relevant data, and also the measures to be taken to protect the Permanent Works.
5. The Contractor shall submit to the Overseeing Organisation details of proposed borrow pits and tipping areas, which are off Site and the intended routing of vehicles to and from such sites.

The Contractor should also inform the Overseeing Organisation of the type of such vehicles to be used for transport, which should be compatible with the standard of the above routes.
6. The Contractor shall provide, erect and maintain such traffic signs, lamps and barriers etc. complying with Clause 117 of the Specification as may be required to ensure the observance of requirements and restrictions detailed in this Appendix.

APPENDIX 1/21: INFORMATION BOARDS

1. Scheme Information Boards

- (i) The Contractor shall supply two scheme information boards, which shall be in accordance with Traffic Signs Regulations and General Directions Diagram Number 7007.1, with the Highways England logo and Department for Transport logo replaced by the following logo:



The legend for signs shall comprise:

- Line 1: "A9 Dualling"
- Line 2: "Luncarty to Pass of Birnam"
- Line 3: "Road Opening" (to be input by the Contractor)

- (ii) The scheme information boards shall be located on the approaches to the Works on the existing trunk road from both directions. The exact location of the scheme information boards shall be agreed on Site by the Overseeing Organisation.
- (iii) The Contractor shall Design, supply and construct suitable poles and foundations for the information boards.
- (iv) The legend shall have an x-height of 150 millimetres.
- (v) Not used.
- (vi) Not used.
- (vii) An A9 Dualling Programme scheme information board (Figure 1/21A below) shall be erected adjacent to the A9 carriageway in advance of the 7007.1 Information Board on both northbound and southbound approaches to the Works. Each A9 Dualling Programme Scheme Information Board shall be of a similar size and scale to the 7007.1 Scheme Information Boards.



Figure 1/21A - A9 Dualling Programme scheme information board

2. Publicity Sign Boards

- (i) The Contractor shall supply three publicity sign boards.

APPENDIX 1/21: INFORMATION BOARDS (Continued)

- (ii) The location of the publicity sign boards shall be at locations to be agreed by the Overseeing Organisation. The publicity boards shall be situated on or adjacent to existing footways or their diversions to enable the public to read them in safety.
- (iii) The publicity sign boards should contain information pertaining to the scope of the works and their progress.
- (iv) The progress information shall be updated by the Contractor on a monthly basis throughout the period for the construction of the Works.
- (v) The publicity sign boards shall consist of a weather tight board which shall be suitable for displaying a minimum of four A3 size pages.

3. Project Sign Board

- (i) The project sign board shall include the following information:
 - Transport Scotland logo (file TS-LRE)
 - A9 Dualling: Luncarty to Pass of Birnam
 - Employer: Transport Scotland
 - Enquiries: (telephone number to be provided by Contractor)
 - Transport Scotland logo (file TS-BS), Jacobs' logo, Contractor's logo
- (ii) The location of the project sign boards shall be at a prominent location at the Site Compound as agreed by the Overseeing Organisation.
- (iii) The project sign board shall have dimensions of 2850 millimetres by 1500 millimetres.
- (iv) The A9 Dualling Luncarty to Pass of Birnam project sign board is shown in Figure 1/21B.
- (v) A separate 'Investing in Scotland' board (file TSI-E), 2850 millimetres by 1500 millimetres shall be attached on the same poles.

APPENDIX 1/21: INFORMATION BOARDS (Continued)



Figure 1/21B – A9 Dualling: Luncarty to Pass of Birnam project sign board

APPENDIX 1/22: PROGRESS PHOTOGRAPHS

The following specification fulfils the progress photographs requirements for the whole of the Works.

1. Ground Progress Photographs

- (i) A set of ground progress photographs shall be taken prior to commencement of the Works on site and then at approximately one month intervals or as directed by the Engineer until Completion of the Works.
- (ii) A set of ground progress photographs shall comprise not less than 50 photographs.
- (iii) Each photograph shall be high-resolution and a minimum of 12 million pixels and incorporate geolocation metadata in the image file. Two copies of each set of progress photographs in high-resolution JPEG format shall also be supplied on hard drive in a standard format.
- (iv) A report shall be provided with each set of photographs detailing the date, location and direction of view for each photograph in the set.

2 Aerial Progress Photographs

- (i) A set of aerial progress photographs shall be taken at the Commencement of the Works and further sets of aerial photographs shall be taken at 2 monthly intervals during the Works. A final set of aerial progress photographs shall be taken immediately following the Date of Completion of the Works.
- (ii) A set of aerial progress photographs shall comprise a minimum of 20 photographs, taken with a Single Lens Reflex Digital Camera.
- (iii) Each photograph shall be high-resolution and a minimum of 12 million pixels and incorporate geolocation metadata in the original file. Two copies of each set of aerial progress photographs in high-resolution JPEG format shall also be supplied on hard drive in a standard format.
- (iv) Photographs shall be taken from the same height, direction and of the same viewpoint at each 2-month interval.
- (v) Viewpoints, heights & directions will be determined & detailed on an Ordnance Survey Map prior to photographs being taken.
- (vi) The choice of aircraft used for taking the shots should be such that it will maximise the accuracy of photographing the viewpoints.

3. The photographer shall be accompanied for both ground and aerial progress photographs by a member of the Overseeing Organisation, should they wish to attend.

4. Copyright of photographs shall be vested in the Overseeing Organisation.

5. Timelapse Photography and Website Use

(i) General

- (a) The Contractor shall arrange to produce a high quality visual record of the construction of the Works.
- (b) In addition to the progress photographs detailed above, the Contractor shall arrange for timelapse photographs to be taken throughout the construction period at a minimum of twelve locations. The Contractor shall propose the precise locations and number of cameras to be used for approval of the Employer

within one month of the commencement of the relevant Design, construction, completion and maintenance of the Works.

- (c) In order to obtain the best quality output, cameras shall be set to obtain an image every 10 minutes.
 - (d) The Employer shall retain the rights to all images obtained by the Contractor. The Contractor may use the images in promotional material if so approved by the Employer, such approval not to be unreasonably withheld.
- (ii) Quality
- (a) The Contractor shall propose the most suitable make and type of camera for each location for the approval of the Employer.
 - (b) Cameras, lenses and sensors shall be of a professional grade and from a reputable supplier.
 - (c) The camera resolution shall be high enough to allow the final film to be rendered as 1080p HD with a minimum resolution of 2816x1880.
 - (d) The optical parameters of the proposed system shall be capable of adjustment from a remote location.
 - (e) The image interval shall be capable of being adjusted remotely to obtain additional detail during specific activities.
 - (f) The cameras shall be mounted on a stable structure that prohibits movement of the camera as a result of external influences such as wind or vibration.
 - (g) Cameras shall be capable of working at night without significant grain or noise (0.002 lux).
- (iii) Reliability
- (a) Each camera location shall have a suitable power and telecoms supply and a backup system shall be available to ensure that there is no loss of data.
 - (b) At each camera location, suitable security measures shall be taken to prevent theft of the equipment.
 - (c) Each camera shall be capable of being remotely monitored to ensure that it is working correctly or as a minimum it should be physically checked daily.
 - (d) The system should be set to automatically restart after a power failure to ensure there is minimal loss of data.
 - (e) All recorded images shall be backed up to a site remote from the camera. This shall be either automatic or undertaken on a daily basis to avoid loss of data.
 - (f) Each camera shall be at least IP65 weather protected.
 - (g) The controlling computer shall have storage facilities for 3 years' timelapse shooting with offsite backup facilities of the original image without further compression or adjustment.
 - (h) All cameras, computer control systems and backup systems shall be regularly maintained throughout the Works.
- (iv) Post Production
- (a) All images shall be catalogued and stored on a secure site with a suitable back up facility.
 - (b) All images shall be time stamped and catalogued in a calendar format for retrieval by the Employer.

APPENDIX 1/22: PROGRESS PHOTOGRAPHS (Continued)

- (c) Where so instructed by the Engineer images from the cameras shall be available to be uploaded by the Contractor to a project website where the general public can monitor the progress of the Works. If instructed the web image shall be updated every 10 minutes. Any images on the public website shall allow zooming and panning around the still image without pixilation.
- (d) The images obtained through the Works shall be used to provide a record of the project. This record shall comprise: individual films of between 5 and 10 minutes duration for works undertaken in individual locations; a single complete film of between 45 and 60 minutes duration and a single complete film of between 20 and 30 minutes duration. To obtain a full record of the construction, sequences may be shown from different cameras. In addition due to the nature of the speed of the construction, the rate of progress may be accelerated at a different rate depending on the particular activity.
- (e) The Contractor shall supply a story board style post production plan outlining how each final film will look for the approval of the Employer prior to work on the final film.
- (f) Due to the overall duration of the project the Contractor shall allow for the production of annual films of 20 minutes duration, providing a record of construction within the preceeding 12 months.

6. Web cams

(i) General

- (a) The Contractor shall provide twenty high definition pan tilt and zoom web cams, which shall provide multidirectional footage of the Works throughout the construction period.
- (b) The exact location for each web cam shall be agreed by the Employer and the chosen locations shall reflect the Works being undertaken during a particular time period in the construction process. The Contractor shall be responsible for the relocation of each web cam following such a request being made by the Employer.
- (c) The web cams shall be active 24 hours per day, 7 days per week and shall be linked through a secure telecommunication system to the main construction compound. Only authorised representatives of the Employer and the Contractor shall be given the security rights to view and alter the orientation of the images being gathered.
- (d) The web cams shall not be able to be viewed by the general public via the world wide web, unless made available by the Employer via the project website. Where a web-based system is proposed this shall be provided via a secure internet site. The use of such a facility shall be subject to the approval of the Employer.
- (e) The Contractor shall be responsible for the maintenance and where necessary, the replacement, of all web cam components. The Contractor shall also be responsible for the provision of all connections, including power, and the computer software required to operate the web cams from the main construction compound.

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM

1. The Contractor shall institute, maintain and operate a Quality Management System complying with BS EN ISO 9001, BS EN ISO 14001 and OHSAS 18001 and Clause 104 of the Specification.

The Quality Management System shall be described in a Quality Plan that shall be submitted to the Overseeing Organisation.

For details relating to the Environmental Management Systems refer to clause 5 of this Appendix 1/24.

The Quality Plan shall cover but not be limited to the following items:

- (i) the Contractor's organisation and management of the Contract;
 - (ii) the Contractor's method statements and construction procedures for the Works;
 - (iii) the Supervision of the Works;
 - (iv) the Contractor's construction quality control for the Works;
 - (v) the Suppliers Quality Plans. (For each of the Quality Management Schemes listed in Appendix A of the Specification for Highway Works.); and
 - (vi) The Contractors deer management plan.
2. The Quality Plan shall conform with but not be limited to the requirements shown in sub-clauses 2.1, 2.2, 2.3, 2.4 and 2.5 of this Appendix, as follows:

- 2.1 Contractor's Organisation and Management of the Contract

This part of the Quality Plan shall include but not be limited to:

- (i) the definition of the Contract and its documentation;
- (ii) the organisation of the Contract including the line of command and communication links between all the parties involved in the Contract in the form of annotated chart(s);
- (iii) the names, roles, responsibilities, curriculum vitae and authority of principals and key personnel involved in the Design, construction and maintenance of the Contract.
- (iv) These will include the roles undertaken by the Project Director, Contracts Manager, Site Agent/Contractor's Project Manager, Management Representative for Quality, Contract Quality Manager, Management Representative for environmental protection, sustainability manager, Sub-agents, General Foreman, Foremen, Engineers, Contract Quantity Surveyor, Safety Officer, Contractor's and Designer's Supervisor(s) for the Works, Designer's Team Leader(s) and Site Representative(s), Checker's Team Leader(s), Road Safety Auditor(s), Planning Supervisor and any other principal party involved in the Design and the Works;
- (v) procedures for the control of consultations, liaison and meetings with third parties including Police Scotland, Undertakers and any other companies;
- (vi) the identification of the Contractor's staff responsible for overseeing each major activity including Design, Design Checks and all sub-contract activities;
- (vii) procedures for the control of sub-contracts which must include the assessment of the sub-contractor's quality assurance and quality control capabilities, the identification and implementation of additional controls needed on such sub-contractors to fulfil the Contractor's obligations in respect of this Appendix and the Contract;
- (viii) procedures for the control of all documentation;

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM (Continued)
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- (ix) a programme for submission of Design and Design Check Certificates and associated documentation, method statements and Suppliers Quality Plans.
- (x) These shall be submitted to the Engineer at least 14 days prior to commencement of the associated activity;
- (xi) the Quality Plans for sub-contractors and suppliers of work, goods and materials which are the subject of quality management schemes.
- (xii) Suppliers Quality Plan(s) for schemes listed in Appendix A of the Specification for Highway Works shall be based on this Appendix;
- (xiii) procedures for the preparation, review and adjustment of programmes for the effective progression and completion of the Design and the Works and the recording of same;
- (xiv) procedures for the control and approval of purchases of materials;
- (xv) procedures for the control of off-Site activities;
- (xvi) procedures for the regular review and recording by the Contractor which demonstrates that the Design and the Works meet the requirements of the Contract;
- (xvii) procedures for the control of personnel selection which demonstrate that such personnel have appropriate skill and experience for undertaking their appointed role;
- (xviii) procedures for the management review/audits to monitor and demonstrate control over the implementation of the Quality Plan;
- (xix) procedures for ensuring compliance with the Specification for Highway Works (SHW) Volume 1 of the Manual of Contract Documents for Highway Works (MCHW);
- (xx) procedures for ensuring compliance with the Design Manual for Roads and Bridges (DMRB) and the Employer's Requirements.
- (xxi) These procedures shall include verification that the relevant sections and sub-sections within the Employer's Requirements have been complied with and shall indicate whether the part of the Design;
 - (a) complies with the sub-section;
 - (b) requires a consultation certificate; or
 - (c) is not relevant to the sub-section
- (xxii) procedures for the review of the Conceptual Design and the preparation of the Design and construction documentation;
- (xxiii) procedures for the review of the Design including the frequency of and personnel responsible for such reviews; and
- (xxiv) any other relevant item which may during the Contract be brought to the attention of the Contractor by the Overseeing Organisation and which shall be inserted into the Quality Plan.

2.2 Contractor's Method Statements and Construction Procedures for the Works

This part of the Quality Plan shall include but not be limited to:

- (i) Detailed method statements for each major activity whether such activities are directly controlled by the Contractor or subcontracted and shall include those major activities listed in sub-clause 4 below.

The method statements shall identify hold points and invoke for all activities:

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM (Continued)

- (a) work instructions;
- (b) quality control procedures;
- (c) compliance testing/inspection arrangements;
- (d) work acceptance procedure; and
- (e) validation of design assumptions by appropriate inspection and testing on site.

Method statements shall describe each stage of the construction, the layout of the Works, identify the Construction Plant and materials to be used, Temporary Works, safety measures, working space considerations, and where appropriate the requirements for skilled labour and/or special supervision and the like.

Where work is subject to environmental requirements, for example, temperature, noise and dust control, working hours, traffic conditions, vehicle routings, screening and the like, these shall be stated.

Hold points shall be identified at stages of work where checks are necessary before continuing. The authority for release of the hold points shall also be identified.

Method Statements and Construction Procedures submitted to the Overseeing Organisation shall be subject to a trial section(s), which may be incorporated into the Works with the consent of the Overseeing Organisation.

- (a) the identification of the relevant construction procedures in the Contractor's own Quality Management System. Procedures invoked by method statements shall include, from the quality controls required by the Contractor's construction quality control: the control, identification and traceability of materials;
- (b) procedures for the prevention of inadvertent use, installation or covering up of non-conforming work; and
- (c) any other corporate and/or contract specific work instructions to be applied.

2.3 Supervision of the Works

This part of the Quality Plan shall include but not be limited to:

- (i) a statement of the Contractor's and Designer's responsibility to supervise the Works including the duty to supervise the construction, completion and testing of the Works;
- (ii) procedures for undertaking the supervision of the Works detailing:
 - (a) the stages of work when the inspection(s) is to be undertaken;
 - (b) the personnel carrying out the inspection(s);
 - (c) the frequency of inspection(s);
 - (d) the procedures to be followed when dealing with non-conforming Works; and
 - (e) the recording of inspection(s)
- (iii) procedures for the review of the extent and frequency of supervision;
- (iv) procedures for the issuing of Construction certificates;
- (v) procedures for document control including the receipt, control and retention of all documents;

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM (Continued)
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- (vi) procedures for reporting progress and the identification of problems; and
- (vii) procedures for the observation of testing and the reporting of results of testing.

2.4 Contractor's Construction Quality Control for the Works

This part of the Quality Plan shall include but not be limited to:

- (i) a statement of the Contractor's organisation for quality control and shall identify the:
 - (a) responsibility for the initiation and updating of the Quality Plan;
 - (b) responsibility of the "Management Representative for Quality" for monitoring and ensuring compliance with the Quality Plan; and
 - (c) responsibility for the adequacy of the quality records produced.
- (ii) procedures for the arrangements for "receiving" and "in-process" testing;
- (iii) procedures for the control of test laboratories;
- (iv) procedures for the control of test, measuring and inspection equipment;
- (v) procedures for document control and shall include their identification, traceability requirements, control of document issues and their status. Documents recording the verification, review, approval, release and amendment of the Works shall similarly be controlled;
- (vi) procedures for monitoring and recording the inspection, test and approval status of the construction/installed work including the identification of "hold points";
- (vii) procedures for tests and inspections for the purpose of the Contractor certifying that prior to covering up, each part of the Works is complete and conforms to the Contract.
 The procedures shall identify the proforma and/or database to be used for recording the inspection and test results, and the proforma to be used for recording the certification of compliance of all items of the Works by authorised key personnel. Each submission shall be separately identified;
- (viii) procedures for the review of work submitted for review but not accepted as conforming to the Contract.
 These procedures shall include options for identification of non-conforming work and proposals for reworking and remedial work; and
- (ix) procedures for the collation of quality records as identified in BS EN ISO 9001, BS EN ISO 14001 and OHSAS 18001 as appropriate, including reference to those records listed in the Specification for Highway Works Appendix H.

2.5 Suppliers' Quality Plans

The Quality Plan shall include but not be limited to:

- (i) a definition of the product or service which shall be provided;
- (ii) annotated chart(s) showing the organisation structure of the Supplier describing the line of command and stating the name of the senior manager responsible for the contracted Work and the name of the Supplier's on-site management representative. Contact addresses, telephone numbers and the like shall be provided.

This shall address all activities, including those sub-let. Names of any sub-contractors and suppliers involved in the production shall be provided;

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM (Continued)
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- (iii) the identification of the relevant parts of the Supplier's Quality Management System relevant to the product or service being provided;
- (iv) procedures for the control of personnel selection (at works and on Site), including special requirements for skilled personnel for example; certification of welders, training of operatives, experience requirements and the like.

The Suppliers shall provide evidence that the training and experience requirements given in the appropriate Quality Assessment Schedule are being met;

- (v) procedures for the receipt and examination of certificates of conformity and test results for purchased products;
- (vi) procedures for product identification and traceability.

Each piece or bundle of delivered product shall be indelibly marked and where appropriate, the lot identification shall be included on each package;

- (vii) procedures for handling, storage, packaging and delivery to Site and storage and handling on Site, including instructions for repair of damaged products where appropriate; and
- (viii) procedures for compiling Quality Records which shall include documents to demonstrate the achievement of the requirement standard for example; Site logs, record of visits, records of verification, review and release, certificates of conformity and records of all Design modifications to products and specifications.

3. Items 1(i), 1(iii) and 1(iv) of the Quality Plan shall be submitted to the Overseeing Organisation for approval not later than 21 days after the award of the Contract.

The Contractor shall submit the remaining parts of the Quality Plan to the Overseeing Organisation for approval prior to commencement of any associated work or activity and to the programme included with item 1(i).

4. Method statements shall be required inter alia for the following activities:

- (i) Traffic Management;
- (ii) Demolition and Site Clearance;
- (iii) Fencing and Environmental Barriers;
- (iv) Road Restraint Systems;
- (v) Drainage and Service Ducts;
- (vi) Earthworks;
- (vii) Road Pavements;
- (viii) Kerbs, Footways and Paved Areas;
- (ix) Traffic Signs;
- (x) Road Lighting;
- (xi) Electrical Works;
- (xii) Structures;
- (xiii) Landscape Operations; and
- (xiv) ITS.

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM (Continued)
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APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM (Continued)

5. Environmental Management System

The Contractor shall institute and maintain, during the construction, completion and maintenance of the Works, an Environmental Management System in accordance with the requirements of BS EN ISO 14001 “Environmental Management Systems – Requirements with guidance for use”.

The environmental management system shall be described in a Construction Environmental Management Plan (CEMP) that shall be submitted to the Overseeing Organisation.

This shall define the organisational policy, structure, responsibilities, practices, procedures, processes and resources provided for environmental management and shall form part of the Quality System as detailed in this Appendix 1/24 of the Specification.

It shall be developed to avoid wherever possible environmental accidents and pollution, to encourage reduced consumption of resources, to restrict the production of waste and to promote good relationships with the relevant authorities.

Commitments made regarding mitigation, their implementation and subsequent monitoring shall be recorded.

Notwithstanding any other requirements of the Contract the Environmental Management System shall:

- (i) Include Site-specific method statements for all operations where there is a risk of environmental damage. These shall show how the proposed methods of construction shall restrict impacts to the best practicable environmental option, and how contingency plans and emergency procedures shall limit damage caused by accidents, spillage or other unforeseen events.

The method statements shall include notification procedures to the relevant authorities;

- (ii) Institute and maintain during the construction of the Works, a Waste Management Plan in accordance with “Waste Management - A Duty of Care - A Code of Practice” - HMSO 1991;
- (iii) Ensure that the Contractor shall submit to the Overseeing Organisation details of the Environmental Management System, method statements and Waste Management Plans for approval in advance of the construction of the Works.

The Works shall not be commenced without such approvals having been obtained in writing from the Overseeing Organisation.

- (iv) Include liaison with the local community during the Contract.

This shall include providing information about activities likely to give rise to complaints, and a telephone number for complaints to be registered.

A log of all complaints and follow-up actions shall be kept and made available for inspection by the Engineer.

- (v) Include NATURA 2000 training for all site personnel, including sub-contractors and suppliers prior to such personnel accessing the Site.

5.1 Site Waste Management Plan

The Contractor shall prepare a Waste Management Plan (“WMP”) as part of the Environmental Management Plan. This shall contain targets to reduce, re-use and / or recycle waste to ensure that no unnecessary waste arisings go to landfill.

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM (Continued)
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As part of the WMP, the Contractor shall provide a system for tracking and recording the movement of all contaminated material and waste within the site. This shall include details of the locations from which material has been excavated and its final placement.

Notwithstanding any other provisions of the Contract the Waste Management Plan shall inter alia define:

- (i) the roles and functions of :
 - a) the Contractor (including the members of the Contractor's site personnel and all other key personnel associated with the Works);
 - b) the Employer; and
 - c) all other sub-contractors and relevant third parties;
- (ii) the execution of the Works and any other matters for which the Contractor shall be responsible under the terms of the Waste Management Plan;
- (iii) the provision of records tracing the origin and location in the Site of everything incorporated in the Works;
- (iv) how the Contractor and any Contractor Party shall minimise any adverse impacts that the Works have on the environment;
- (v) how the design process, materials selection, construction techniques, and operational methods shall minimise any adverse impacts that the Works have on the environment;
- (vi) how the Waste Management Plan shall comply with regulatory requirements; and
- (vii) project-specific targets for waste recovery and reused and recycled content and for waste reduction.

The Contractor shall provide the following information to the Engineer in which the performance for construction, demolition and excavation waste streams shall be identified separately:

- (i) prior to starting on site, provide a copy of the Waste Management Plan, which shall identify but not be limited to:
 - a) the estimated total mass of waste and the estimated recovery rate before mitigating actions, with a list of actions to reduce waste and increase the level of recovery (distinguishing construction, demolition/strip-out and excavation wastes as appropriate) and increase reused and recycled content; and
 - b) a revised estimate of the total mass of waste and the estimated recovery rate after mitigating actions, and forecast performance indicators for:
 - i. tonnes of waste sent to landfill per £[REDACTED] construction value; and
 - ii. tonnes of waste produced per £[REDACTED] construction value.
- (ii) A monthly report identifying actual performance for waste quantities, disposal routes, and reused and recycled content used in construction, identifying the following indicators of actual performance:
 - a) tonnes of waste sent to landfill per £[REDACTED] construction value; and
 - b) tonnes of waste produced per £[REDACTED] construction value.

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM (Continued)
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- (iii) Upon completion of the Works, a completed Site Waste Management Plan, identifying the forecast and actual performance for waste quantities, disposal routes, and reused and recycled content used in construction, including the following indicators of actual performance:
 - a) tonnes of waste sent to landfill per £[REDACTED] construction value; and
 - b) tonnes of waste produced per £[REDACTED] construction value.

APPENDIX 1/70: SITE SAFETY**1.0 General**

- 1.1 The Contractor at all times shall comply with the requirements of the Health and Safety at Work Etc. Act 1974 and any other Acts, Regulations or Orders pertaining to the health and safety of employees.
- 1.2 The Contractor shall comply with his own published Safety Policy, the Construction (Design and Management) Regulations 2015 (CDM) and the requirements of this Contract.
- 1.3 The Contractor shall while carrying out the works comply with the following:
- The Waste Management Licensing (Scotland) Regulations 2011
 - Control of Substances Hazardous to Health (COSHH) Regulations 2002
 - Environmental Protection (Duty of Care) Regulations 1991
 - Electricity at Work Regulations 1989
 - The Working Time Road Transport Directive (2002/15/EC) unless exempt under the Horizontal Amending Directive 203 in which case the UK domestic Driver's hours will apply.
- 1.4 The Contractor shall prior to complying with paragraphs 1 to 4 carry out a formal risk assessment as required by the Management of Health and Safety at Statutory Instrument No. 2951, conforming to the Code of Practice. The records of any risk assessment shall be maintained and made available for inspection by the Engineer at any time.
- 1.5 The Engineer may suspend the work or part thereof in the event of non-compliance by the Contractor with health and safety matters as described in the Contract. The Contractor shall not resume the work until the Engineer is satisfied that the noncompliance has been rectified. In respect of any such period of suspension, the Contractor shall not add any cost to the work price and no extra time shall be allowed for completion.

2.0 The Wearing of Safety Helmets

- 2.1 All sites under the jurisdiction of the Overseeing Organisation must be managed in strict accordance with the Construction (Head Protection) Regulations 1989 and supporting Health and Safety Executive guidance.
- 2.2 When entering into any sub-contract for the execution of parts of the works, the Contractor shall bring this requirement to the attention of the Sub-contractor.
- 2.3 The Contractor shall display at appropriate locations signs as described in the HSE Guidance on Regulations (Regulation 5).
- 2.4 The Contractor's attention is drawn to Clause 16 of the Conditions of Contract with respect to the removal from the site of any person who fails to conform to a particular provision set out in the Specification with regard to safety.

3.0 High Visibility Clothing

- 3.1 The Contractor's attention is specifically drawn to paragraph 18 of Clause 117 of the Specification regarding the wearing of high visibility clothing. It should be noted that all vests and jackets are to be long-sleeved only, with no exceptions.
- 3.2 The Contractor shall ensure that the clothing required to be worn is maintained to a standard that accords with its intended use.

APPENDIX 2/1: LIST OF BUILDINGS, ETC TO BE DEMOLISHED OR PARTIALLY DEMOLISHED

The following buildings and structures shall be demolished: -

- (i) Ladner Cottage; and
- (ii) Ordie Bridge (Tulleybelton Junction).

APPENDIX 2/4: EXPLOSIVES AND BLASTING

1. The use of explosives and blasting within the Site shall not be permitted.

APPENDIX 2/5: HAZARDOUS MATERIALS

The following shall be included as part of the Specification Appendix 2/5 to be completed by the Contractor.

1. In the event that hazardous or suspected hazardous material is found on site during the Works the Contractor shall stop Works in the vicinity and cordon the area off. He shall then instigate a contamination survey, which shall be an intrusive investigation and shall include collection of samples of soil and water for chemical testing. Only personnel experienced in this type of work shall carry out this investigation.
2. Samples collected as part of the investigation shall be subjected to chemical analysis at laboratories with UKAS and MCERTS accreditation for the tests being performed. The MCERTS accreditation extending only to those determinants listed in Annex A of Performance Standards for Laboratories Undertaking Chemical Testing of Soil published by the Environment Agency.
3. On completion of the investigation and chemical analysis the Contractor shall arrange for appropriately qualified personnel to undertake a contaminated land environmental risk assessment and prepare a remediation strategy.
4. The Contractor shall consult with and conform to the requirements of the Controlling Authorities, which shall include SEPA and Environmental Health Officer, Perth and Kinross Council, for the remediation of the site.
5. The Contractor shall arrange for Type 3 pre-demolition asbestos surveys to be undertaken by experienced and fully qualified surveyors on all buildings, structures etc. listed in Appendix 2/1, in accordance with Regulation 4 of the Control of Asbestos Regulations (CAR 2012), to locate and risk assess any asbestos containing materials (ACMs) present. All surveys and sampling for suspected ACMs shall be carried out to the highest standards as required by the Health and Safety Executive guidance document 'MDHS 100'. All samples taken shall be analysed by an independent, UKAS accredited laboratory.
6. The Contractor shall arrange for the removal and disposal of any asbestos-containing materials in accordance with The Control of Asbestos Regulations 2012 by a sub-contractor that is licensed by the Health & Safety Executive.

APPENDIX 3/1: FENCING, GATES AND STILES

1. The location of Accommodation Works fencing and gates are shown on the Accommodation Works drawings as listed in Appendix 0/4. Additional fencing and gate requirements are listed in Section 4.2.3 of Part 1 of the Employer's Requirements with fencing types shown on the drawings listed in Appendix 0/4.
2. Fencing for the protection of planted areas shall be provided in accordance with sub-Clauses 306.4 (i) and 306.5 (i).
3. Fencing for the protection of wildlife including otters, shall be located as detailed in the Employer's Requirements and shall be in accordance with Clause 370AR.
4. Temporary boundary fencing shall be erected in accordance with HCD Drawing No H1 Fencing Type 1. The Contractor shall be responsible for the maintenance and removal/disposal of this fencing.
5. All timber for temporary and permanent fencing shall be treated off site unless otherwise agreed by the Engineer.
6. No paddles shall be permitted for use for anti-glare screening.

APPENDIX 4/1: ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN)

1. This Appendix has been written in accordance with TD 19/06: Requirement for Road Restraint Systems.
2. Road vehicle restraint systems shall comply with the Containment Performance Class and Working Width requirements for safety barriers, vehicle parapets etc., as described in the SHW Series 400 published in TD19/06.
3. The Contractor shall be responsible for the design, selection, submission for acceptance, and installation of road vehicle restraint systems necessary for completion of the works.
4. The Contractor shall submit to the Overseeing Organisation full details of his proposed vehicle restraint systems for approval.
5. Safety barriers shall be continuous for each installation, and shall be provided with suitable transitions or connections for each safety barrier system and into proposed parapets or structures as appropriate.
6. Safety barrier posts set in bound materials in excess of 40mm thick shall be installed in sockets. The top surface of passive filler to sockets shall be finished flush with the surrounding surface. Any unused post sockets shall be fitted with caps.
7. At all changes of type of road vehicle restraint system and/or containment level, suitable transitions shall be provided in accordance with TD 19/06, Section 6.

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS1317-1, BS EN1317-2, BS-EN 1317-3 AND DD ENV 1317-4:2002

The Contractor shall submit the following supporting information demonstrating compliance with BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4:2002 to the Engineer for acceptance:

EUROPEAN COMMITTEE FOR STANDARDIZATION (CEN) COMPLIANCE

Initial submission documents to be supplied for consideration of initial type test are as follows:

1. Test reports in accordance with Section 6 of BS EN 1317-2:2010 for safety barriers (including any additional test data required under clauses 7.3 and 7.4 of DD ENV 1317-4:2002 for terminals and transitions of safety barriers) and Section 8 of BS EN 1317-3:2010 for crash cushions.
2. Video/high speed film of test annotated showing date, test number and performance class.
3. Still photographs of complete installation including anchorage points.
4. Still photographs of vehicle before and after impact.
5. Full drawings of tested items.
6. Certification from the manufacturer that the item tested complies with drawing supplied.
7. Certificate from test house accredited in accordance with the requirements of Series 400 of the MCHW.

Additional information, which will be required on acceptance of initial type test prior to installation.

8. Manufacturer's specification.
9. Installation drawings.
10. Manufacturer's installation instructions including foundation requirements and test methods to verify their performance.
11. Manufacturer's repair and maintenance manual.
12. Certificate of compliance for Quality Management Sector Scheme 1 for the Manufacture of Fencing Components ¹.
13. Certificate of compliance for Quality Management Sector Scheme 2B for Vehicle Restraint Systems ¹.
14. Certificate of compliance for Quality Management Sector Scheme 5 for the Fabrication and Installation of Bridge Parapets and Cradle Anchorages ².
 - (i) Sector Scheme 5A for The Manufacture of Parapets for Road Restraint Systems; and
 - (ii) Sector Scheme 5B for The Installation of Parapets for Road Restraint Systems.
15. Nominal loads (direct forces, moments and co-existent shears) to be transferred from the parapet to the structure or foundations 2 & 3.

Notes:

¹ Items 12 and 13 are required for safety barrier systems and transitions.

² Items 14 and 15 are required for vehicle parapets.

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS1317-1, BS EN1317-2, BS-EN 1317-3 AND DD ENV 1317-4:2002 (Continued)

Sheet 1 of 4

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1, BS EN 1317-2, BS EN 1317-3, AND DD ENV 1317-4:2002				
TYPE OF VEHICLE RESTRAINT SYSTEM:				
CONTAINMENT PERFORMANCE CLASS/PERFORMANCE LEVEL/PERFORMANCE CLASS (*):				
TEST REPORT NUMBER:		(Test of)		
Test Type: Primary/Complementary Test) (*)				
TEST NUMBER:		TEST DATE:		
(*) delete as appropriate				
COMPANY NAME:				
CONTACT:				
ADDRESS:				
Tel:/Fax:/E-mail:				
PRODUCT NAME:				
Initial submission documents to be supplied for consideration of Initial Type Test (ITT)				
Item		Comment	Item Received (Y or N)	Date requested
1	Test report	Test reports in accordance with Section 6 of BS EN 1317-2:2010 for safety barriers (including any additional test data required under clauses 7.3 and 7.4 of DD ENV 1317-4:2002 for terminals and transitions of safety barriers) and Section 8 of BS EN 1317-3:2010 for crash cushions		
2	Video/high speed film	Of test coverage as specified in relevant part of BS EN 1317 or DD ENV 1317-4:2002 Annotated showing date, test number and performance class		
3	Still photographs	Of complete installation including anchorage points		
4	Still photographs	Of vehicle before and after impact		
5	Drawings	Fully detailed drawings of tested item		
6	Certification from the manufacturer	Confirming that the item tested complies with drawing supplied		
7	Confirmation from test house	That the test conforms to the relevant requirements of BS EN 1317-1 (and including any additional test data required under BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4:2002)		
Additional information, which will be required on acceptance of initial type test prior to installation				
8	System specification	Manufacturer's specification		
9	Installation details	Manufacturer's drawings		
10	Installation procedures	Manufacturer's installation instructions		
11	Maintenance Manual	Manufacturer's inspection, repair and maintenance instructions		
12	Certificate of compliance	With the Quality Management Sector Scheme 1 for Manufacture of Fencing Components ¹		
13	Certificate of compliance	With the Quality Management Sector Scheme 2B for the Supply and Installation of Vehicle Restraint Systems ¹		
14	Certificate of compliance	With the Quality Management Sector Scheme 5 for the Fabrication and Installation of Bridge Parapets and Cradle Anchorages ² 1) Sector Scheme 5A for The Manufacture of Parapets for Road Restraint Systems; and 2) Sector Scheme 5B for The Installation of Parapets for Road Restraint Systems		

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS1317-1, BS EN1317-2, BS-EN 1317-3 AND DD ENV 1317-4:2002 (Continued)

15	Support loads	Nominal loads (direct loads, bending moments and shear forces) that have to be transferred from the vehicle restraint system to the supporting structure or foundation ²		
Signature:		Name:		
Date:				
Notes:				
<ol style="list-style-type: none"> 1. Items 12 and 13 are required for safety barrier systems and transitions 2. Items 14 and 15 are required for vehicle parapets 				

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS1317-1, BS EN1317-2, BS-EN 1317-3 AND DD ENV 1317-4:2002 (Continued)

BS EN 1317-2, clause 5.3.2	Installation	<ol style="list-style-type: none"> 1) The length of the safety barrier or vehicle parapet tested shall be sufficient to demonstrate the full performance characteristic of any longer installation. After the test the adequacy of the length of installation shall be checked by procedure as the one in Annex B. The test lengths shall be defined by the manufacturer prior to the test so that the car test(s) demonstrates the maximum severity of impact, and the large vehicle test demonstrates the maximum dynamic deflection characteristics 2) End conditions (for example end anchorage) shall be provided in accordance with the safety barrier including vehicle parapet specification and defined by the manufacturer. If an end anchorage is used which is specifically for testing and not part of the design of the system being tested, this end anchorage shall be fully described in the test report. Any end anchorage should not restrict the maximum lateral deflection of the safety barrier. 3) Foundations shall meet the design specification 4) When testing pretensioned systems, where tension can be adjusted (for example cable barriers), the small vehicle test shall be performed with a tension corresponding to a temperature of - 10 °C and the large vehicle test with a tension corresponding to a temperature of + 30 °C. For the containment levels with only one test, the tension shall correspond to a temperature of 0 °C. The data for the recommended tensions/temperature shall be supplied by the manufacturer 5) Where a vehicle parapet is required to have infilling or other modification in order that it may function as a vehicle pedestrian parapet, this infilling or other modification shall be included in the test installation if it will affect the performance of the vehicle parapet 			
BS EN 1317-2, clause 4.4	Severity Indices	<p>SPECIFIED</p> <p>THIV Limit 33km/h</p> <p>PHD Limit 20g</p> <p>ASI Limit 1.4</p>	<p>ACTUAL</p> <p>THIV km/h</p> <p>PHD g</p> <p>ASI </p>		
BS EN 1317-2, clause 5.6, Figure 4	Photo-graphic coverage	<ol style="list-style-type: none"> 1) Photographic coverage shall be sufficient to clearly describe the barrier including vehicle parapet behaviour and the vehicle motion during and after impact 2) A known scale shall be visible in overhead camera view to assist measurement from the photographic coverage following the test. 3) High speed cameras shall be operated at a minimum of 200 frames per second 4) Normal speed cameras shall be operated at a minimum of 24 frames per second 5) As recommended in clause 5.7 and Figure 4 			
	Drawings	Drawings included			
			N/A = Not Applicable		
FULLY COMPLIES WITH STANDARD: BS EN 1317-1, BS EN 1317-2, DD ENV 1317-4:2002					
Signature:		Name:			
Date:					

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS1317-1, BS EN1317-2, BS-EN 1317-3 AND DD ENV 1317-4:2002 (Continued)

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<p>SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1, and BS EN 1317-3</p> <p>TYPE OF VEHICLE RESTRAINT SYSTEM: Crash Cushion (Redirective [R] or Non-redirective [NR] (*)</p> <p>TEST REPORT NUMBER: _____ TEST TYPE: (Primary/Complementary Test) (*) _____</p> <p>PERFORMANCE LEVEL: _____ VELOCITY CLASS: _____ (Test of)</p> <p>TEST NUMBER: _____ TEST DATE: _____</p> <p>(*) delete as appropriate</p>					
<p>COMPANY NAME:</p> <p>CONTACT:</p> <p>ADDRESS:</p> <p>Tel./Fax:/E-mail:</p> <p>PRODUCT NAME:</p>					
		Specified	Actual	Satisfactory (Yes or No)	Compliance
BS EN 1317-1, Table 1	Vehicle Details	Impact Conditions			
		Total vehicle mass (kg) (±...)		
		Speed (km/h) (0, +7%)		
		Angle (degrees) (-1, +1.5)		
		Centre of Gravity			
		Vertical height (m) (± 10%)		
		Longitudinal (m) (± 10%)		
		Lateral (m)	±		
		Model			N/A
BS EN 1317-3, clause 6.2	Crash Cushion Behaviour	<ol style="list-style-type: none"> 1) Elements of the crash cushion shall not penetrate the passenger compartment of the vehicle. There shall be no deformations of, or intrusions into, the passenger compartment that could cause serious injuries to the occupants. 2) All totally detached parts of the crash cushion with a mass greater than 2,0 kg shall be included in the determination of the displacement classification (see 6.5 of BS EN 1317-3). 3) Foundations, ground anchorages and fixings shall perform according to the design of the crash cushion. The deformed crash cushion shall not encroach into the front surface of the obstacle. 			
BS EN 1317-3, clause 6.3	Vehicle Behaviour	<ol style="list-style-type: none"> 1) The vehicle shall not roll over (including rollover of the vehicle onto its side) during or after impact. 2) The post-impact trajectory of the test vehicle shall be evaluated by means of the exit box shown in Figures 5a and 5b as well as that detailed in Table 10, Table 11 and the full clause 6.3 of BS EN 1317-3. 			
BS EN 1317-3, clause 7.3.2	Installation	<ol style="list-style-type: none"> 1) The installation of the crash cushion for the test, including its foundations, shall comply with the structural design details and with the on-road system details as given in the design specification. 			
BS EN 1317-3, clause 5.5 and Table 3	Impact Severity Indices	<p>SPECIFIED</p> <p>Level A: THIV ≤ 44km/h (Tests 1, 2 & 3) THIV ≤ 33km/h (Tests 4 & 5) ASI ≤ 1.0</p> <p>Level B: THIV ≤ 44km/h (Tests 1, 2 & 3) HIV ≤ 33km/h (Tests 4 & 5) ASI ≤ 1.4</p> <p>Levels A & B: PHD ≤ 20g</p>	ACTUAL		

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS1317-1, BS EN1317-2, BS-EN 1317-3 AND DD ENV 1317-4:2002 (Continued)

BS EN 1317-3, clause 7.4.7, Figure 8 and Figure 9	Photo-graphic coverage	<ol style="list-style-type: none"> 1) High speed cameras and/or high speed video cameras shall be operated at a minimum of 200 frames per second. 2) The photographic coverage shall be at minimum as indicated in Figure 8. 3) As recommended in clause 7.4.7, Figure 8 and Figure 9. 		
	Drawings	Drawings included		
			N/A = Not Applicable	
FULLY COMPLIES WITH STANDARD: BS EN 1317-1, and BS EN 1317-3				
Signature:			Name:	
Date:				

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS1317-1, BS EN1317-2, BS-EN 1317-3 AND DD ENV 1317-4:2002 (Continued)

Sheet 4 of 4

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1 AND DD ENV 1317-4:2002					
TYPE OF VEHICLE RESTRAINT SYSTEM: Terminal					
PERFORMANCE CLASS: (Test of)					
Test Type: Primary/Complementary Test) (*)					
TEST TYPE NUMBER:					
TEST NUMBER: TEST DATE:					
(*) delete as appropriate					
COMPANY NAME:					
CONTACT:					
ADDRESS:					
Tel./Fax:/E-mail:					
PRODUCT NAME:					
		Specified	Actual	Satisfactory (Yes or No)	Compliance
BS EN 1317-1, Table 1 DD ENV 1317-4:2002, clauses 7.4 and 7.5	Vehicle Details	Impact Conditions Total vehicle mass (kg) (±...) Speed (km/h) (0, +7%) Angle (degrees) (-1, +1.5)			
		Centre of Gravity Vertical height (m) (± 10%) Longitudinal (m) (± 10%) Lateral (m) ±			
		Model			N/A
DD ENV 1317-4:2002, clauses 5.4 and 5.5.2	Terminal Behaviour	<ol style="list-style-type: none"> Elements of the terminal shall not penetrate the passenger compartment of the vehicle. Deformations of, or intrusions into, the passenger compartment that could cause serious injuries are not permitted. No major part of the terminal shall be come totally detached and come to rest outside the permanent lateral displacement zones defined in clause 5.4. Anchorage and fixings shall perform to the terminal design specifications and other specified requirements as listed in the rest report. 			
DD ENV 1317-4:2002, clause 5.5.3	Vehicle Behaviour	<ol style="list-style-type: none"> The vehicle shall not overturn, although rolling, yawing and moderate pitching may be accepted. For the performance class P1 rolling onto a side may be accepted. The exit box values for the specified test are as defined in Figure 5, Table 7 and Table 8 (as appropriate). 			
DD ENV 1317-4, 2002 clause 7.3.2	Installation	<ol style="list-style-type: none"> The terminal and transition shall conform to the structural design details and with the system installation details as given in the design specification of the manufacturer. 			
DD ENV 1317-4:2002, clause 5.5.4 and Table 5	Impact Severity Indices	SPECIFIED Level A: THIV ≤ 44km/h (Tests 1, 2 & 3) THIV ≤ 33km/h (Tests 4 & 5) ASI ≤ 1.0 Level B: THIV ≤ 44km/h (Tests 1, 2 & 3) HIV ≤ 33km/h (Tests 4 & 5) ASI ≤ 1.4 Levels A & B: PHD ≤ 20g	ACTUAL		

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS1317-1, BS EN1317-2, BS-EN 1317-3 AND DD ENV 1317-4:2002 (Continued)

DD ENV 1317-4, 2002 clause 7.7, Figure 7	Photo-graphic coverage	<ol style="list-style-type: none"> 1. Photographic coverage shall be sufficient to describe clearly terminal/transition and vehicle motion during and after impact. 2. High speed cameras and/or high speed video cameras shall be operated at a minimum of 200 frames per second. 3. High speed cameras and one normal speed camera shall be located to record the performance of the terminal/transition. For the recommended camera schedule see Figure 7. 		
	Drawings	Drawings included		
FULLY COMPLIES WITH STANDARD: BS EN 1317-1 AND DD ENV 1317-4:2002				
Signature:		Name:		
Date:				

APPENDIX 6/12: INSTRUMENTATION AND MONITORING

This Specification sets out the minimum instrumentation and monitoring requirements for the Works. The Contractor shall amend the Specification to reflect any additional monitoring proposed.

1. The locations of instrumentation and details of the instruments required shall be shown on the Earthworks Drawings.
2. All instruments shall be numbered and labelled by type, mainline chainage and offset from the proposed alignment centreline. For example, Surface Movement Pegs at chainage 200.00m off-set up slope and down slope of proposed alignment centreline by 20m would be labelled as SMP 200/U20 and SMP 200/D20 respectively.

The following instrumentation is required as part of the Works as a minimum requirement:

Instrument Type	Minimum Requirement
<p>Surface Movement Peg (SMP)</p> <p>The Contractor shall propose a design suitable for monitoring slope instability movements. The detail of monitoring installations shall be approved by the Engineer.</p>	As specified by the Designer
<p>Inclinometer (INC)</p> <p>Inclinometers shall be installed by a specialist geotechnical instrument contractor and shall be industry standard kit suitable for monitoring slope instability movements. Inclinometer installations shall extend a minimum length of 2m into bedrock.</p>	As specified by the Designer
<p>Piezometers (PZ)</p> <p>The design and installation of piezometers shall be suitable to monitor groundwater levels within the deposits in which they are installed including groundwater levels at the drift / bedrock level interface.</p>	As specified by the Designer
<p>Other Instrumentation</p>	As specified by the Designer

The Designer shall design a geotechnical instrumentation and monitoring scheme appropriate for their design incorporating the above minimum requirements.

3. Not required.
4. All instruments shall be installed by the Contractor prior to construction at any specific location and shall be surveyed by the Contractor to provide X, Y, Z co-ordinates for each station to an accuracy of +/- 2mm.
5. The Contractor shall calibrate and monitor all instruments for baseline readings at least two weeks ahead of adjacent or overlying construction during which the Contractor shall take three sets of base readings. The results shall be provided to the Designer to confirm that all readings are repeatable before adjacent Works are commenced.

APPENDIX 6/12: INSTRUMENTATION AND MONITORING (Continued)

6. All monitoring stations shall be clearly marked with a unique reference number as above. The Contractor shall ensure that all instruments are protected from damage during installation. As appropriate on completion of installation the Contractor shall provide/erect temporary surface protection of the instruments so that damage by site traffic or other plant does not occur.
7. Not required.
8. Monitoring instruments shall be read as a minimum requirement to the frequency and accuracy indicated in the following table:

Table 6/12 - 1

Instrument	Location	Frequency of reading	Accuracy
Surface Movement Points	Above / below extent of proposed works.	Twice Weekly	+/- 5mm
Surface Movement Points	Above temporary works adjacent to sections of live carriageway	Daily	+/- 2mm
Inclinometer	General	Fortnightly	+/- 1mm
Piezometer	General	Twice weekly	+/- 10mm
Other instrumentation	As specified by the Designer		

Monitoring shall be undertaken throughout the duration of the Works or until a period agreed with the Designer. In the case of surface movement monitoring this is likely to be when negligible movement has been demonstrated following the completion of adjacent earthwork activities.

In the case of surface movement monitoring points and inclinometers any changes in position or level beyond the required accuracy tolerances set out in the above table shall be reported immediately to the Designer.

The results of all monitoring shall be reviewed by the Designer not more than 24hrs after readings are taken. The Contractor shall make available the results of all monitoring data to the Designer in digital (Excel Spreadsheet) format and also as a graphical plot (Excel Format) such that changes with time are apparent. The exact format of the presentation of results is to be agreed with the Designer. Following each measurement, the Contractor shall update the database and graphical output immediately.

All monitoring data shall be made available to the Employer not more than 7 days after readings are taken or as and when requested.

APPENDIX 15/1: MOTORWAY COMMUNICATIONS
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1. Testing and Certification

1.1 General

- (i) The Contractor shall test and commission all TSE to ensure that all Active Equipment and the Passive Network are commissioned in a stable and controlled manner, minimising the risk associated with connecting devices to the live network supporting the TSS.
- (ii) The Contractor shall ensure that the risk of users or the public from being distracted by the testing of light or sound emitting devices is minimised.
- (iii) Where tests are unsuccessful the Contractor shall undertake investigations to determine the cause of failure and shall notify Transport Scotland in writing what shall be done by The Contractor to correct the failure. The Contractor shall undertake testing, investigation and corrections until tests are successful.
- (iv) Transport Scotland will accept back into the Transport Scotland Service Nominated TSIE Store all TSIE notified by The Contractor as faulty. The faulty TSIE, or part thereof, will be replaced or repaired by Transport Scotland as detailed in Section 4.8.4 of Part 1.

1.2 Pre-Site and On-Site Tests

- (i) All TSE supplied to the Contractor as TSIE shall have been subject to appropriate production, factory acceptance and validation testing by Transport Scotland to confirm that it is of suitable quality and achieves Transport Scotland's TSE requirements.
- (ii) Transport Scotland shall also undertake appropriate TSE pre-issue tests prior to releasing the TSE to The Contractor.
- (iii) The Contractor may have a representative present at any appropriate TSE pre-issue tests to be undertaken by Transport Scotland. Any request to attend such testing shall be made in writing to Transport Scotland at least 28 days prior to the start of any appropriate TSE pre-issue tests. The Contractor should note that some items of TSE are procured in bulk ahead of time, and for such items it may not be possible for the Contractor to have a representative present for the pre-issue tests.
- (iv) The Contractor shall undertake a visual inspection of all TSIE to determine if the equipment is physically damaged. These inspections and subsequent actions if damage is noted shall be undertaken as follows:
 - (a) for TSIE uplifted from TSS Nominated TSIE Store the Contractor shall undertake inspections at the time of uplift. Damage shall be reported to the operator of TSS Nominated TSIE Store where a written record of any damage shall be agreed and recorded with the operator. Depending on the nature of the damage, the operator will determine if the TSIE can be uplifted by The Contractor for use in the Works.
 - (b) for TSIE issued from a TSS supplier and delivered to the Site, the Contractor shall undertake inspections at the time of delivery. If damage is present The Contractor shall take digital photographs that display the time and date on the image and immediately send by email the photographic evidence of damage to Transport Scotland. Transport Scotland will determine if the TSIE should be returned to the supplier or if an on-site repair can be undertaken by the TSS supplier. The Contractor shall document the on-site repairs agreed with Transport Scotland that require to be undertaken. If on site repairs cannot be undertaken The Contractor and Transport Scotland shall jointly agree that the

APPENDIX 15/1: MOTORWAY COMMUNICATIONS (Continued)
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TSIE shall be uplifted by the supplier or immediately returned on the supplier's delivery vehicle.

- (v) TSIE inspected by the Contractor in accordance with Section 1.2 (iv) of this Appendix 15/1 and not deemed to be satisfactory for including in the Works shall be repaired or replaced by Transport Scotland in accordance with Section 4.8.4 of Part 1.

1.3 Installation Tests

- (i) The Contractor shall test and commission the Passive Network.
- (ii) The Contractor shall undertake all testing of fibre optic, loop and power cables in accordance with the Employer's Requirements of and the Specification. The Contractor shall not undertake testing of sub surface vehicle detection loops until the final pavement surface course works are complete.
- (iii) The Contractor shall undertake end to end testing of the installed fibre optic and multi-pair cables. The Contractor shall also test each dedicated link or circuit to each TSE location.
- (iv) The Contractor shall test ducts and chambers in accordance with the Specification.
- (v) Cabinet installations shall be tested in accordance with the Specification and any specific manufacturer supplied testing regimes.
- (vi) Active Equipment shall not be installed within cabinets on Site until permanent power supplies have been installed, tested and certified and all environmental protection such as cabinet seals have been completed and certified.
- (vii) Active Equipment shall not be connected to the Passive Network until all tests for the individual Passive Network components have been successfully completed and certified.
- (viii) Any faulty or non-operational TSIE identified during or at the end of these installation tests shall be notified within 24 hours to Transport Scotland and replaced by the Contractor with fully functioning TSIE issued by Transport Scotland in accordance with Section 4.8.4 of Part 1.

1.4 Site Acceptance Tests (SAT)

- (i) The Contractor shall carry out Standalone SATs on all installed TSE. These tests shall demonstrate and provide certification that the TSE is functionally operational locally at each of the individual sites prior to connection to the core communication network.
- (ii) Any faulty or non-operational TSIE identified during or at the end of these SATs shall be notified within 24 hours to Transport Scotland and shall either be replaced by the Contractor with fully functioning TSIE issued by Transport Scotland, or repaired by Transport Scotland in accordance with Section 4.8.4 of Part 1.
- (iii) Standalone SATs shall comprise of operational testing defined within equipment information to be issued by Transport Scotland for the TSIE. Such information will detail localised testing to be undertaken on the TSIE in isolation from the scheme wide passive network.

1.5 Traffic Scotland Service Integration

- (i) Once the Contractor has successfully completed the SATs Transport Scotland will transfer the TSE across to the TSS live network and undertake final integration with the assistance of The Contractor. The assistance to be provided by the Contractor may

APPENDIX 15/1: MOTORWAY COMMUNICATIONS (Continued)
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include, but is not limited to, traffic management, test engineers and fault finding/locating of any faults preventing completion of integration. If required The Contractor shall either replace faulty TSIE with fully functioning TSIE issued by Transport Scotland, or assist Transport Scotland in repairing the faulty TSIE.

2. Training

- (i) The Contractor shall provide comprehensive training for all Contractor provided components of the Passive Network that TSS maintainers, installers and operators may use to carry out their duties on TSE. This training shall be tailored to suit each of the following groups:
 - (a) management / supervisors / operators;
 - (b) installation, testing and commissioning personnel; and
 - (c) maintenance personnel.
- (ii) The training shall include classroom and site based components as necessary to demonstrate the equipment, procedures and safe handling and shall accommodate six staff in each of the groups detailed in Section 2 (i) of this Appendix 15/1.
- (iii) The Contractor shall produce training manuals and documentation to be used in the training that will subsequently be incorporated with the documentation of Section 2 (i) of this Appendix 15/1.
- (iv) Successful training shall be provided and completed at least 28 days before the commissioning on Site of any Active Equipment. The Contractor shall submit to Transport Scotland a training programme identifying the recommended group of staff to attend and the time periods designated.
- (v) At the end of the course those trained shall be able to expand, maintain and support the Active Equipment provided by The Contractor without any on-going support from The Contractor.
- (vi) The Contractor shall at the end of the course provide feedback forms for the participants to complete. Transport Scotland shall review the completed feedback forms to determine if the training has been comprehensive and has been understood by the attendees. Should Transport Scotland determine that the training has not informed, either in part or in full as appropriate, the Contractor shall then improve and repeat the training course within 14 days of notification by Transport Scotland.

3. Programme

- (i) The Contractor shall provide a detailed programme for the ITS works to Transport Scotland within 56 days of the Effective Date for any ITS works being undertaken on Site.
- (ii) The programme for ITS works shall include all appropriate references to these Employer's Requirements and shall provide details of:
 - (a) complete all installation, testing and commissioning works detailed in this Part 2 to the satisfaction of Transport Scotland;
 - (b) submission of TSE design and design data;
 - (c) Passive Network diversions, re-routing or relocation;
 - (d) commencement on site for surveys and preparation;

APPENDIX 15/1: MOTORWAY COMMUNICATIONS (Continued)
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- (e) commencement of Temporary Works and each Temporary Works activity;
- (f) all disconnections and connections to TSE;
- (g) access to TSNCC or other TS facilities;
- (h) uplift of all TSIE from the TS nominated store;
- (i) delivery of all client equipment direct from the supplier;
- (j) incremental installation of all TSE;
- (k) testing of all TSE;
- (l) commissioning of all TSE;
- (m) power network diversions;
- (n) order, and completion of individual incoming power supplies from the Electricity Supply Company;
- (o) requirement for site data or the host systems amendments; and
- (p) issue of draft and final documentation.

APPENDIX 30/1: GENERAL

**Sub-
Clause****Notice and Liaison**

- 3001.2 (i) The Contractor shall give 48 hours notice to the Engineer prior to commencing any of the operations listed under sub clause 3001.2 and the following:
- Watering;
 - Works to Waterbodies;
 - Setting out of planting plots, seeding areas and individual plant stations for all plants;
 - Preparation of planting pits prior to backfilling;
 - Arrival of compost, topsoil, soil additives and soil ameliorants on site;
 - Arrival of plants on site; and
 - Each visit during the Period of Establishment Maintenance Replacement planting and defects checks.
- (ii) The Contractor shall give 7 working days notice to the Engineer prior to commencing the following:
- vegetation clearance and tree removal;
 - works in or adjacent to sites of archaeological interest including site identified during the archaeological watching brief;
 - works in or adjacent to sites of ecological importance including:
 - Natura Sites including Special Protection Areas and Special Areas of Conservation;
 - Sites of Special Scientific Interest; and
 - Sites with protected species or otherwise designated for their nature conservation interest.
- (iii) The Contractor shall liaise with other landowners directly only after obtaining the agreement in writing of the Engineer.
- (iv) Landscape and ecology Works shall comply with this Series and the associated quality management schemes detailed in Appendix 1/24.

Peat

- 3001.3 Peat and peat based products shall not be used except with the written agreement of the Engineer.

APPENDIX 30/1: GENERAL (Continued)

**Sub-
Clause****Pesticide Application**

- 3001.13 Pesticide record forms in accordance with the template attached, detailing information as required in sub-clause 3001.12, shall be submitted to the Engineer on a monthly basis during the construction works and immediately after each application during the Period of Establishment Maintenance.

In addition to the requirements of specification sub-Clauses 3001.4 to 13, the chemical(s) used shall be selected at the discretion of and at the sole risk of the Contractor having due regard to the location, site soil and vegetation type; public access, nature conservation interests, the season and the species. The Contractor's attention is specifically drawn to the Control of Substances Hazardous to Health Legislation (COSHH). All chemicals for use on horticultural Works shall be non-toxic to human beings, birds and animals under normal use and, in the vicinity of watercourses, shall be non-toxic to aquatic organisms.

Application of herbicides etc shall be by persons qualified in accordance with statutory requirements relevant to their use, and trained to the appropriate National Proficiency Test Council Standard (N.P.T.C.) or similar certified accordingly.

The minimum standard for persons using herbicides shall be N.P.T.C/ group 6A – Hand held applicators. For vehicle mounted spraying the minimum standard shall be N.P.T.C. Group 2A.

Bird Nesting Season

- 3001.14 Damaging or destroying the nest of any wild bird (whilst being built or in use) is an offence under the Wildlife and Countryside Act 1981. Therefore any clearance or felling of vegetation, in which birds could nest, should be undertaken outside the breeding season. The bird nesting period for the Contract shall be from March to August inclusive, unless otherwise agreed in writing with SNH.

Should the Contractor require to undertake any works during the breeding season, the Contractor shall be responsible for undertaking all necessary ecological surveys, watching briefs to determine the presence or otherwise of nesting birds. Only when the required surveys demonstrate the absence of nesting birds, and approval from the Engineer has been confirmed, can the works proceed and in doing so shall take full cognisance of any special measures identified within the ecological surveys.

APPENDIX 30/1: GENERAL (Continued)

**Sub-
Clause****Inspection Reports**

3001.15 Inspection reports shall be prepared in accordance with the template attached by the Contractor's landscape architect and shall be submitted to the Engineer at the following intervals:

- (i) In the case of activities carried out under Clause 3007 and 3010 once per year.
- (ii) In the case of activities carried out under Clause 3009:
 - a) Six times per year in the first year of the Period of Establishment Maintenance;
 - b) Four times per year in the second year of the Period of Establishment Maintenance; and
 - c) Three times per year for the remainder of the Period of Establishment Maintenance.

APPENDIX 30/1: GENERAL (Continued)

LANDSCAPE WORKS – PESTICIDE RECORD	
Contract Reference number:	Date of visit : (minimum one record per day)
Contract Name:	
Name of Contractor:	
Contractor's telephone no:	
Operations carried out	
Pesticide used	
Location of operation	
Total weed control	
Selective herbicide	
Weed control in vicinity of any burn, ditch, or open water	
Weed control around planting	
Weed control to cultivated beds	
Other	
Names of operatives on site:	Qualifications of operatives:
Supervisor	
Storeman	
Application by:	
Signed for Contractor	
Contractor's observations on damage or any other incidents:	

APPENDIX 30/1: GENERAL (Continued)

LANDSCAPE WORKS – INSPECTION REPORT	
Contract Reference number:	Date of visit : (minimum one record per day)
Contract Name:	
Name of Contractor:	
Contractor’s telephone no:	
Operations carried out:	
Location of operation:	
Names of operatives on site:	Qualifications of operatives:
Contractor’s observations on damage or any other incidents:	
This maintenance visit has been satisfactorily completed.	
SIGNED (for Contractor)	
NAME (Block Capitals)	DATE.
SIGNED (For Engineer)	
NAME: (Block Capitals)	DATE

APPENDIX 30/2: WEED CONTROL

**Sub-
Clause****General**

3002.1 Weed control for all injurious weed species and Invasive Non Native Species, including those listed in sub-Clause 3011.4 with the addition of Oil Seed Rape and Rhododendron, shall be carried out throughout the Works until the end of the Period of Establishment Maintenance at sufficient frequency to eliminate them and prevent their spread.

In locations where effective weed control shall be possible and practicable by other means allowed within the Contract there shall be a presumption against the use of chemical herbicides.

Total Weed Control

3002.3 Herbicides for total weed control shall be applied during the growing season at a frequency to ensure full control of weeds from the start of works to the end of the Period of Establishment Maintenance to the following locations:

- (i) All paved areas and hardstandings, filter drains and gravel areas including but not limited to gravelled central reservations; and
- (ii) As otherwise instructed.

The Contractor shall apply herbicides at sufficient frequency to eliminate weed growth throughout the Works Period until the end of the Period of Establishment Maintenance. No less than two applications shall be made each year.

3002.4 Total weed control by a non-residual translocated herbicide shall apply to the following locations:

- (i) All areas prior to seeding or planting;
- (ii) All stockpiles of topsoil; and
- (iii) A 250mm radius around each plant station or clump of plants in all planting areas.

Application shall be frequent enough to keep the plant circles weed free, prior to Completion and thereafter, throughout the Period of Establishment Maintenance. A suitable period of time, as recommended by the herbicide manufacturer, shall be allowed to elapse between herbicide application and planting or seeding/turfing operations.

3002.5 A translocated herbicide approved by the Scottish Environment Protection Agency (SEPA) or their successors for use in or near water shall be used for weed control in all open ditches, lagoons, watercourses and filter drains. All use of herbicides in or near water shall be subject to SEPA's approval which shall be obtained through submission of a Non-Aerial Herbicide use in or Near Water: Application Form. Control shall be at sufficient frequency to eliminate weed growth throughout the Works until the end of the Period of Establishment Maintenance.

APPENDIX 30/2: WEED CONTROL (Continued)

APPENDIX 30/2: WEED CONTROL (Continued)

**Sub-
Clause****Selective Weed Control in Grass**

3002.6 Selective weed control using translocated herbicide shall be applied in all non-hardened verges, central reserves, planted areas and other grassed areas.

Operations shall be carried out 3 times per year in March, April and June from the start of the works until the end of the Period of Establishment Maintenance and additionally when necessary to restrict growth and prevent the spread of broadleaf weed species as directed by the Engineer. Treatments shall be during periods of active growth.

Selective weed control shall not be used on newly seeded areas within 6 months after sowing depending on the season of seeding and the herbicide manufacturer's recommendations.

Selective weed control shall not be used in areas of heath turves and species rich grassland.

Weed Control by Spot Application of Herbicide

3002.7 Weed control by spot application of translocated herbicide shall be undertaken as necessary to control weed species listed in Sub Clause 3002.1, and in any case no less than twice a year during periods of active growth throughout the Works until the end of the Period of Establishment Maintenance at the following locations:

- (i) For control of injurious weeds in grass and wildflower areas;
- (ii) All woodland and planted areas;
- (iii) All hedgerow planting areas; and
- (iv) As otherwise instructed.

Spot treatment shall typically be via controlled droplet application of a type appropriate to the herbicide, the species being treated and the location.

Herbicides shall not be used on newly seeded areas for 4 to 6 months after sowing depending on the season of seeding and the herbicide manufacturers' recommendations.

A combination of spot treatment and hand weeding may be required to control all weeds listed in Clause 3002.1 and infestations of annual, biannual and perennial weeds. Spraying shall be at the appropriate time of year and growth development of the plant species to be targeted when plants are actively growing throughout the year.

APPENDIX 30/2: WEED CONTROL (Continued)

**Sub-
Clause****Weed Control by Pulling/Hand weeding**

3002.8 Weed control by hand weeding shall be carried out as necessary, and in any case no less than twice a year throughout the Works until the end of the Period of Establishment Maintenance at the following locations:

- (i) All woodland and other planting areas where herbicide application may cause damage;
- (ii) Hedgerow planting where spot application may cause damage;
- (iii) Wildflower areas and areas densely populated with desirable broadleaf species where spot application may cause damage;
- (iv) Within plant protectors and tree/shrub shelters;
- (v) Around planting stations in existing woodland; and
- (vi) Where necessary throughout the Site boundary for the elimination of Ragwort and Oil Seed Rape.

Weed Control by Cutting

3002.9 The Contractor shall carry out weed control by cutting as necessary in areas where the extent of growth or type of weed cannot be effectively controlled by herbicide application or hand weeding and in newly seeded grass areas where the grass is too young for herbicide application.

Arisings from Weed Control Operations

3002.10 The Contractor shall remove all arisings in accordance with sub-clause 3002.10 from weed control operations that involve hand weeding and cutting. Following weed control by herbicide the Contractor shall refer to the manufacturer's instructions for the period of time for removal of dead weeds following herbicide application.

APPENDIX 30/3: CONTROL OF RABBITS AND DEER
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**Sub-
Clause****General**

- 3003.1 The Contractor shall carry out rabbit, hare and deer control as necessary to ensure successful establishment of all planting and seeding areas for the duration of the Works until the end of the Period of Establishment Maintenance. Control shall include preventing the establishment of rabbit warrens and damage to existing retained vegetation and grass.

Any existing warrens or rabbit burrows within any planting areas shall be cleared of rabbits and the entry/exit holes effectively blocked prior to any planting taking place.

All individual guards and shelters shall be maintained as an effective rabbit and hare proof barrier, for the duration of the Works until the end of the Period of Establishment Maintenance.

Control Operations

- 3003.5 Brambles and herbage that interfere with the control of rabbits shall be cut and the arisings dealt with in accordance with sub-Clauses 3010.3 and 3010.4. The arisings shall be used to form habitat piles in locations within the Site where they are not likely to become visually intrusive or interfere with access or maintenance.

- 3003.6 Initial clearance and thereafter effective control of rabbit infestations shall be undertaken within the Site.

Rabbit Control within the Site Boundary

- 3003.8 The Contractor shall ensure effective rabbit control during the Works and for the entire duration of the Period of Establishment Maintenance and shall be responsible for contacting adjacent landowners regarding their obligation to control infestations on their own land.

The Contractor shall carry out regular site inspections to ensure effective control of rabbits for all areas of the site from the start of Works on site until the end of the Period of Establishment Maintenance.

- 3003.9 The Contractor shall undertake an inspection of the site accompanied by representative of the Engineer at monthly intervals to ensure effective control has been achieved.

Clearance Of Rabbits And Deer Within Planted Areas If Deemed Necessary Once Operations Have Started On Site

- 3003.10 Any rabbit burrows located within fenced enclosures for planting shall be cleared of all rabbits and all entry/exit holes effectively blocked immediately after completing the fencing of each enclosure.

APPENDIX 30/3: CONTROL OF RABBITS AND DEER (Continued)
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**Sub-
Clause**

3003.11 The Contractor shall not plant any area until all rabbits, hares and deer have been cleared from any fenced enclosure.

The Contractor shall maintain planting enclosures free of rabbits and burrows including exit/entry holes, and deer for the Period of Establishment Maintenance.

Clearance of Rabbits and Deer in Fenced Areas to be Planted

3003.12 The Contractor shall keep planting enclosures free of rabbits, rabbit burrows including exit/entry holes and deer until such time that planting has become fully established and is of sufficient size and maturity so as to be no longer vulnerable to significant damage but not earlier than the end of the Period of Establishment Maintenance.

3003.13 The Contractor shall replace all damaged plants on a like-for-like basis during the Contract period and maintain them for the entire duration of the Period of Establishment Maintenance.

APPENDIX 30/4: GROUND PREPARATION

**Sub-
Clause****Vegetation Clearance**

- 3004.1 Grasses and other herbaceous vegetation on all areas to be planted or seeded (except where noxious weeds are to be treated) shall be cut in accordance with sub-Clause 3002.9 to a height between 50 mm and 75 mm and the arisings removed off site.
- 3004.2 The Contractor shall apply a non-residual translocated herbicide in accordance with sub-Clause 3002.4 to all areas to be planted or seeded (with the exception of areas in existing woodland and other planted areas) between 21-25 days prior to planting.
- At standard, heavy standard and extra heavy standard tree planting stations all existing grass and herbaceous vegetation shall be cut to the full extent of the area required to be excavated for planting pits prior to excavation of the pits.

Sub Soil Treatments

- 3004.5 Subsoil in planting areas, excluding areas which shall be planted in inverted turfs within areas of undisturbed ground, shall be ripped to a minimum depth of 450 millimetres prior to spreading of topsoil.
- Areas in existing arable or pasture land which shall be planted shall be ripped to a minimum depth of 600 millimetres to ensure the breaking up of any subsoil compaction.
- 3004.6 A conventional subsoiler shall be used (not winged) with tines at 600mm spacing

Final Preparation of Soils

- 3004.7 The requirements of sub-clauses 3004.8 - 3004.11 shall apply to all subsoil to be seeded or topsoil spread, including all planting and seeding/turfing areas, all other existing soiled areas to be seeded/turfed or planted that have been damaged by the works and any areas to be reinstated, except where otherwise stated in Appendix 30/4.

APPENDIX 30/4: GROUND PREPARATION (Continued)

**Sub-
Clause**

3004.8 All undesirable material brought to the surface including, but not limited to, stones, roots, tufts of grass and foreign matter larger than the sizes specified below shall be removed off Site unless otherwise agreed with the Engineer.

The size of the stones / debris which shall be removed relates to the proposed vegetation type. The maximum stone / debris size permitted for each, is as follows :

- (i) Grass verges and visibility splays: 25 millimetre protruding stone after topsoil has been firmed / rolled;
- (ii) All other grassland and wildflower grassland: 50 millimetre;
- (iii) Planted areas except amenity / ornamental shrub planting: 75 millimetre; and
- (iv) Amenity / ornamental shrub planting: 50 millimetres.

The above stone removal shall apply to the full depth of topsoil required for the proposed vegetation cover.

The overall stone content by percentage volume shall not be greater than that of the adjacent soils.

Stones brought to the surface during final preparation of soils shall be retained on site and used to form habitat piles in locations that are not visually intrusive and shall not interfere with access or the maintenance of the Site. All non-organic foreign matter shall be removed off site.

APPENDIX 30/5: GRASS SEEDING, WILDFLOWER SEEDING AND TURFING

**Sub-
Clause****Season**

- 3005.1 Subject to suitable weather conditions grass seed shall be sown during the periods 1 March to 31 May or 1 September to 31 October when the soil is moist and workable and as agreed with the Engineer. Seeding shall be undertaken in the first available season as soon as soil preparations have been completed.

The Contractor shall ensure grass seeding operations are undertaken at the optimum time when soils are warm enough to allow the seed to germinate i.e. when the soil temperature is above 4 degrees.

Wildflower seed shall be sown in early spring or autumn at the same time as grass or as otherwise recommended by the supplier.

Final Cultivations

- 3005.2 All areas to be seeded or turfed shall be cultivated as per sub-clause 3005.2, with the exception of rock faces. A 250 millimetre radius shall be left clear of cultivation and seeding around each new tree and shrub. Cultivations shall extend into adjacent grass areas to ensure full marrying in of levels.

Final cultivations of soils shall be during dry conditions.

- 3005.3 All areas to be seeded with General Purpose Grass and productive grass shall have fertiliser and or other soil ameliorants incorporated into the upper 50 millimetre of soil at a rate(s) considered necessary for successful establishment. The rate of application and composition of fertilizer and other ameliorants shall be based upon the topsoil test results (as per Appendix 1/5).

No fertiliser or soil ameliorants shall be applied to areas to be seeded with wildflower (species rich) grassland.

Seed

- 3005.4 Grass seed mixes shall be approved by the Engineer and shall be as follows:

Verge and General Purpose Grass Mix

A General Purpose Grass seed mix shall be used in road verges, embankments and cuttings not planted or where other grassland is required. The seed mix(es) shall provide a rapidly establishing sward to provide an appearance and habitat which reflects adjacent and surrounding grassland communities. The mix(es) shall reflect the diversity of grassland communities along the route as described in the Environmental Assessment Documents

APPENDIX 30/5: GRASS SEEDING, WILDFLOWER SEEDING AND TURFING (Continued)

Semi-Natural Grass Mix

The following wildflower seed mix shall be applied to all proposed species rich grassland areas and open glades within woodland and scrub planting areas to the south of Coltrannie overbridge.

Latin Name	Common Name	% Mix
Wildflowers (20%)		
<i>Achillea millefolium</i>	Yarrow	1
<i>Centaurea nigra</i>	Common Knapweed	1
<i>Cerastium fontanum</i>	Common Mouse-ear	1
<i>Galium verum</i>	Lady's Bedstraw	2
<i>Lathyrus pratensis</i>	Meadow Vetchling	0.5
<i>Leucanthemum vulgare</i>	Ox-eye Daisy	2
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	0.5
<i>Pimpinella saxifraga</i>	Burnet Saxifrage	0.2
<i>Plantago lanceolata</i>	Ribwort Plantain	2
<i>Primula veris</i>	Cowslip	0.1
<i>Prunella vulgaris</i>	Selfheal	2
<i>Ranunculus acris</i>	Meadow Buttercup	2.5
<i>Rhinanthus minor</i>	Yellow Rattle	1.2
<i>Rumex acetosa</i>	Common Sorrel	1.5
<i>Scorzoneroideis autumnalis</i>	Autumn Hawkbit	0.5
<i>Succisa pratensis</i>	Devils-bit Scabious	0.5
<i>Vicia cracca</i>	Tufted Vetch	1.5
Grasses (80%)		
<i>Agrostis capillaris</i>	Common Bent (c)	8
<i>Alopecurus pratensis</i>	Meadow Foxtail (c)	3
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	5
<i>Cynosurus cristatus</i>	Crested Dog's-tail (c)	12
<i>Festuca rubra ssp. commutata</i>	Chewings Fescue (c)	35
<i>Poa pratensis</i>	Smooth-stalked Meadow Grass (c)	17

APPENDIX 30/5: GRASS SEEDING, WILDFLOWER SEEDING AND TURFING (Continued)

Proposed Acid Grassland / Moorland Mix

The following wildflower seed mix shall be applied to all proposed species rich grassland areas and open glades within woodland and scrub planting areas to the north of Coltrannie overbridge at a sowing rate of 3g/m²:

Latin Name	Common Name	% Mix
Wildflowers (20%)		
<i>Achillea millefolium</i>	Yarrow	1
<i>Alchemilla alpina</i>	Alpine Lady's Mantle	0.3
<i>Calluna vulgaris</i>	Heather	1
<i>Erica cinerea</i>	Bell heather	0.5
<i>Campanula rotundifolia</i>	Bluebell/Harebell	0.2
<i>Galium verum</i>	Lady's Bedstraw	2
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	1.5
<i>Plantago lanceolata</i>	Ribwort Plantain	1
<i>Potentilla erecta</i>	Tormentil	0.2
<i>Prunella vulgaris</i>	Selfheal	2
<i>Ranunculus acris</i>	Meadow Buttercup	2
<i>Rumex acetosella</i>	Sheep's Sorrel	2
<i>Stellaria graminea</i>	Lesser Stitchwort	1
<i>Succisa pratensis</i>	Devils-bit Scabious	2
<i>Trifolium repens</i>	White Clover	1.9
<i>Veronica chamaedrys</i>	Germander Speedwell	0.5
<i>Veronica officinalis</i>	Common Speedwell	0.5
<i>Viola riviniana</i>	Common Dog Violet	0.4
Grasses (80%)		
<i>Agrostis capillaris</i>	Common Bent (c)	5
<i>Agrostis vinealis</i>	Brown Bent	2
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	5
<i>Cynosarus cristatus</i>	Crested Dog's-tail	12
<i>Deschampsia flexuosa</i>	Wavy Hair Grass	15
<i>Festuca ovina</i>	Sheeps Fescue	25
<i>Festuca rubra</i>	Red Fescue	15.1
<i>Luzula multiflora</i>	Heath Wood Rush	0.5
<i>Molinia caerulea</i>	Purple Moor Grass	0.2
<i>Nardus stricta</i>	Mat Grass	0.2

APPENDIX 30/5: GRASS SEEDING, WILDFLOWER SEEDING AND TURFING (Continued)
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**Sub-
Clause**

Additional Clause All grass seed shall have a certified germination of not less than 10% and a certificate of purity of not less than 90%. Total weed seed and other crop seed content shall be not more than 1%. All grass seed shall be from an approved source and true to name and be noted as not intended for fodder production in the UK National List latest edition. All seed is to be delivered to site in the supplier's original bags, unopened. A label shall be attached to each bag giving details of species and percentage breakdown. The same details shall be enclosed within each bag. Each bag shall be numbered uniquely and relate to the label and documents within the bag. The documents shall be submitted to the Engineer prior to sowing.

The Contractor shall provide fresh seed for each season throughout the Contract period. Grass and wildflower seed shall be stored in dry, cool and vermin proof conditions away from sources of heat or sunlight such as radiators or windows.

3005.6 A supplier's certificate giving the composition, purity, germination year of harvest and country of origin of the individual grasses in any seed mixture shall be submitted to the Engineer a minimum of two weeks before sowing is due to take place. Seed which is vermin damaged or not to specification or certificate shall be rejected and the Contractor shall, at their own expense, replace such seed with an equivalent quantity which shall be inspected and approved by the Engineer. The seed mixture shall meet the requirements for germination and purity laid down in BS 4428:1989 Section 5.1

3005.7 Wildflower seed shall be of UK native origin and where possible from Local UK Provenance Zones 202 or 203 as defined in Figure 1 of Forestry Commission Practice Note 8: Using Local Stock for Planting Native Trees and Shrubs (August 1999).

The Contractor shall complete and submit to the Engineer a wildflower seed Provenance Certificate in accordance with the Certification Procedure.

If nursery propagated seed is used the Contractor shall allow sufficient time in their programme to ensure that the seed is available when required for sowing.

All wildflower seed shall be tested by an independent organisation such as the Scottish Agricultural Science Agency (SASA) to verify purity of seed (percentage of seed / inert material), species composition, and percentage germination. The test certificates shall be made available to the Engineer for consent prior to sowing.

The wildflower seed mixes shall contain a minimum percentage of:

- i) 95% pure seed, not inert material (% by weight); and
- ii) a percentage of flora rather than grass seed species which matches the percentage of flora species in the surrounding plant communities of greatest nature conservation value.

Seeds within the wildflower seed mixes shall have a minimum germination rate of 80%.

APPENDIX 30/5: GRASS SEEDING, WILDFLOWER SEEDING AND TURFING (Continued)
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**Sub-
Clause****Conventional Sowing**

3005.8 Sowing of seed shall be carried out at the rate specified below or in accordance with the supplier's recommendations if different:

General Purpose Grass seed shall be sown at a rate of not less than 20g/m² for verges and side slopes of cuttings and embankments and 15g/m² elsewhere.

Wildflower grassland areas shall be sown at a rate of not less than 5g/m². Grass seed for land to be returned to agricultural use shall be sown: 25g/m².

The sowing of seed shall be carried out as soon as practicable in order to benefit soils stabilisation.

Semi-Natural Grass mix and Acid Grassland / Moorland shall be sown at a rate of 3g/m².

Approval shall be sought from the Engineer where alternative sowing rates are proposed, in advance of any seeding operations commencing.

Hydraulic Seeding

3005.10 Hydraulic seeding shall be applied only subject to the agreement of the Engineer, in areas which cannot be practicably broadcast seeded by hand or mechanical means. The seed mixes for hydraulic seeding shall be as per conventional sowing. The rate of application of grass seed for hydraulic seeding shall be the same as for hand or broadcast seeding unless otherwise agreed with the Engineer. The other ingredients in the hydraulic mixture shall be as recommended by the specialist hydroseeding sub-contractor and agreed with the Engineer.

The Contractor shall be responsible for arranging access to water and any other licences, which may be required.

Turf

3005.14 Any turf imported shall comply with sub-clause 3005.14 and shall contain a grass and/or herb mixture which reflects adjacent and surrounding grassland communities.

3005.25 Turf on slopes greater than 1 in 4 shall be secured using either galvanised wire pins or softwood pegs as per sub-clause 3005.25.

3005.26 Newly laid turf shall be watered as per sub-clause 3005.26.

Establishment Cuts

3005.29 Verge and General Purpose Grass shall be cut to 20mm height each time the sward has reached 50mm height. A minimum of two establishment cuts shall be undertaken, with further cuts as necessary to achieve coverage as stated in sub-clause 3005.11 and one cut subsequent to the required sward coverage being achieved.

There shall be no establishment cut for Semi-Natural Grass and Acid Grassland / Moorland Mix grassland.

A list of machinery and plant proposed to be used by the Contractor for mowing shall be submitted to the Engineer for approval prior to commencing cutting on site.

APPENDIX 30/5: GRASS SEEDING, WILDFLOWER SEEDING AND TURFING (Continued)

**Sub-
Clause**

Additional Sub-clause Humps or depressions appearing after sowing of grass seed shall be levelled or filled with new topsoil and re-seeded using the relevant seed mixture listed in 3005.4 above.

3005.30 All General Purpose Grass areas shall be left clear of grass clippings following each mowing by raking or other suitable method except where grass height is less than 200mm at the time of cutting in which case grass cuttings may be left in situ.

Heath Turfing of 'green' strip on Gelly overbridge

Additional Sub-clause Turves containing heather (*Calluna vulgaris* / *Erica cinerea*) and/or other typical heathland plant species such as blaeberry (*Vaccinium myrtillus*) shall be selected from a suitable donor site within the Site identified by the Contractor's Ecologist and agreed with the Engineer.

Turf stripping, storage and re-laying of turves shall be undertaken under the supervision of the contractor's ecologist.

Turves shall be cut in blocks not smaller than 0.75m x 0.75m from the donor site to a suitable depth to include the roots of the heathland plant species.

Turves shall be re-laid in their final position within 24 hours of lifting. If this is not possible, turves shall be temporarily laid flat on topsoil and kept moist. Turves shall not be stored in stacks.

Turves shall be laid on soil that is moist but not frozen or waterlogged, as defined in Clause 618. Turf shall not be laid during periods of drought or onto soil that is excessively dry, or during heavy rainfall.

Levels shall be adjusted by raking out or infilling with fine soil under the turves. When laid, turves shall be lightly tamped in place, taking care to avoid damage to plants. The use of rollers shall not be permitted.

Immediately after laying, turfed areas shall be watered at a rate of 15 l/m².

Newly turfed areas shall be watered as necessary to ensure establishment. When turfed areas require irrigation, water shall be applied at the rate of 15 l/m² using low pressure hose sprinkler or spray evenly over the entire area.

APPENDIX 30/6: PLANTING

**Sub-
Clause****Plants**

3006.03 Plant stock and sizes shall be as Tables 30/6.1, 30/6.2, 30/6.3 and 30/6.4. Species, varieties and plant spacings shall be in accordance with the Employer's Requirements and the Indicative Landscape and Planting Works drawings.

Table 30/6.1 Specimen Trees

Type	Girth at 1 metre Above Ground Level (centimetres)	Clear Stems from Ground Level (metres)	Minimum Height from Ground Level (metres)	Maximum Height from Ground Level (metres)
Extra heavy standard	14-20	1.8	4.25	6.0
Heavy standard	12-14	1.8	3.5	4.25
Standard	8-10	1.75	2.5	3.0
Large rootballed specimens	-	-	1.5	1.75
Large conifers – rootballed	-	-	1.5	1.75

Table 30/6.2 Trees - Feathered, Transplants and Container Grown Stock

Type	Minimum Age	Minimum Height Above Ground Level	Minimum Container Size
Transplants whips (broadleaves only)	2+1 years	450 millimetres	-
Transplant in tree shelters (broadleaves only)	1+1 years	400 millimetres	-
Container grown evergreens	2+1years	600 millimetres Holly to be cut back to 200 millimetres immediately prior to delivery	2 litres
Feathered Trees	as B.S.	1.5-2.5 metres	-

APPENDIX 30/6: PLANTING (Continued)

Table 30/6.3: Cell Grown Stock

Type	Approximate Height (millimetres)	Minimum Cell Volume (ml)	Minimum Root Collar Diameter (millimetres)
Conifers	200-400	150	5
	200-400	350	8
Broadleaves	400-600	150	6
	400-750	350	8
Holly	200-400	150	7
Shrubs	200-400	150	5
At least 25% of plants shall be supplied in the larger size range. Plants in 350ml cells shall not be more than 3 years old. All other plants shall not be more than 2 years old.			

Table 30/6.4 Shrubs, Conifers, Hedge Plants, Climbers and Ground Cover Plants

Type	Minimum Age	Column A Acceptable Height	Column B Minimum Height for Small/Slow Growing Plants not Readily Available to Sizes Shown in Column A
Bare root/Hedge plants	2+1 years	400-600 millimetres	-
Transplants	1+1years	400-600 millimetres	-
Container grown shrubs and conifers	2+1 years	450-600 millimetres	300-450 millimetres
Container grown climbers	3 years	600-900 millimetres	400-600 millimetres
Ground cover plants	3 years	300-450 millimetres	150-200 millimetres
Rooted Cuttings	2years	400-600 millimetres	

APPENDIX 30/6: PLANTING (Continued)

**Sub-
Clause**

Additional Sub-clause All native species plants shall be of British Origin and from the Local UK Provenance Zone 202 or 203 as defined by Forestry Commission Practice Note 8: Using Local Stock for Planting Native Trees and Shrubs (August 1999). All plants shall be obtained from a Horticultural Trades Association (HTA) accredited nursery in the Nursery Certification Scheme. The Provenance Certificate pro-forma supplied in Part 3 of the Employer's Requirements.

The Contractor shall provide written confirmation that the United Kingdom native plant species of trees, shrubs climbers and wildflower (seeds and plants) have been sourced from the highest available preference for selecting native seed sources. This confirmation, which shall be provided prior to the commencement of the landscape planting Works, shall consist of the completed Provenance Certificates. Where there is a choice of form of plant, the highest preference shall be given to the most local provenance.

3006.7 The Contractor shall make arrangements for the Engineer to select individual trees of Standard size and larger, at the nursery.

3006.10 Labels, canes and ties shall be removed immediately after planting and disposed of off Site.

Additional Sub-clause *Acer pseudoplatanus* (sycamore) shall not be permitted for planting within the site. *Quercus* (oak) species shall not be permitted in vicinity of Ordie View.

Additional Sub-clause Holly species grown to over 500 millimetres height shall be cut back to 200 millimetres immediately prior to delivery.

APPENDIX 30/6: PLANTING (Continued)

**Sub-
Clause**

3006.12 Tree pits shall be back-filled with Class 5A (Site won) topsoil.

Imported Class 5B topsoil, to make up deficiencies on site, shall comply with BS 3882: 2007 specifications for Multipurpose topsoil, as specified in Table 1 and Figure 1 of that publication.

Topsoil shall be imported from a source approved by the Engineer. It shall be friable, not be sticky or leave a polished surface when smeared or be easily moulded when moist. It shall be free from subsoil, rubbish, roots of perennial weeds, non-soil material, brick or other construction materials, any toxic substances and substances injurious to plant growth including contamination from Japanese Knotweed or Himalayan Balsam. Topsoil shall be free of rubbish and stones over 50mm in diameter.

Laboratory analyses and units of measurement shall be in accordance with the methods and units specified in BS 3882. Analyses shall cover soil texture/particle size analysis, stone content, pH value, nutrient content (N, P, K and Mg), organic matter content (through loss on ignition) and electrical conductivity (supplemented by exchangeable sodium percentage, where appropriate). Laboratory analysis shall be submitted to the Engineer together with topsoil samples for approval.

Analyses shall be carried out of levels of potentially phyto-toxic metals, comprising cadmium, copper, lead, nickel, zinc, water soluble boron, arsenic, mercury, chromium. It should be noted that the ICRL Guidelines referred to in BS 3882 have been superseded by Defra's Contaminated Land Exposure Assessment (CLEA2002). However, the quoted levels there are for soil contaminants in relation to human health and maximum threshold levels are too high for most plants. For example, copper becomes toxic to plants at levels in excess of 300 mg/kg but the CLEA guidelines allow copper levels of up to 154,500 mg/kg. The issue of phyto-toxicity is extremely complex (being related to such factors as pH) and the suitability of imported topsoil with elevated levels of metals will have to be assessed by the Engineer who will seek expert advice.

Elevated levels (as ppm in dry matter) shall be taken to be as follows:

- Copper 200.0 ppm
- Zinc 400.0
- Lead 200.0
- Nickel 50.0
- Chromium 100.0
- Cadmium 1.5
- Mercury 1.0

APPENDIX 30/6: PLANTING (Continued)

**Sub-
Clause**

- 3006.13 Planting compost shall not be required unless deemed otherwise by testing of the site-won or imported topsoil.
- 3006.14 Compost pH, conductivity and nutrient composition shall be decided in compliance with the Contractor's Quality Plan and associated method statements based on the results of topsoil tests.
- Additional Sub-clause Class A acidic topsoil with a pH of not greater than 6 shall be spread to the required depth [450 mm] on the landscape strip on Gelly overbridge.
- 3006.15 Slow release fertiliser shall be incorporated into backfill, into the top 75 millimetres of planting bed soil, at the following standard rates using the fertiliser specified unless the results of the soil tests indicate otherwise.
- Slow release fertilizer with a Nitrogen: Potassium: Phosphorus: Magnesium ratio of 14:8:13:2 shall be incorporated into the backfill of tree pits/planting areas as follows:
- (i) Standard trees: 20g;
 - (ii) Heavy Standard trees: 40g;
 - (iii) Extra Heavy Standard trees 100g; and
 - (iv) Woodland planting beds 50g per square metre.
- 3006.16 Root dips shall be applied to all bare root plants and anti-desiccant sprays shall be applied to all conifers at the following times:
- (i) At the time of lifting from the nursery;
 - (ii) On arrival at site; and
 - (iii) Immediately prior to planting.
- Additional Sub-clause All plants shall be dipped in a solution of, or dusted with powder of, mycorrhizal fungi appropriate to the plant species at a rate in accordance with the fungi supplier, immediately prior to planting.

Time of Planting

- 3006.17 All bare rooted stock shall be planted between December and February; container and cell grown nursery stock shall be planted from November to 31 March during favourable weather conditions. Bare rooted or root balled conifers or evergreens shall be planted during November or March.

Planting Depth

- 3006.22 For Container grown plants and rootballed plants, the Contractor shall ensure that the top of the rootball is covered with a 10 – 30mm depth, layer of soil to prevent drying out. All other plants shall be planted to the depth of their nursery soil mark.

APPENDIX 30/6: PLANTING (Continued)

**Sub-
Clause****Notch Planting of Trees, Shrubs and Hedges**

- 3006.23 Bare root whips, transplants and cell grown plants may be notch planted into areas of cultivated or existing topsoil of minimum 300 millimetres depth in accordance with methods (i) of sub-clause 3006.23 unless planting is into inverted turves, when method (ii) shall be used.

Planting Pits, Beds and Trenches

- 3006.24 Pits for whips, transplants and shrubs shall be dug in accordance with sub-clause 3006.24 in locations where topsoil depths are less than 300 millimetres. All container grown plants shall be pit planted. Trenches for hedges shall be dug in locations where there is less than 300 millimetres depth of topsoil.

Arisings from planting pits and trenches shall be retained on the Site and deposited within proposed landscape earthworks.

Planting in Cultivated Beds and Hedges

- 3006.28 Hedge trenches excavated in accordance with Table 30/1 shall be backfilled with a mixture of 80% topsoil and 20% compost with slow release fertiliser added as required to make up for any nutrient deficiencies identified in the soil test results.

- 3006.29 All planting areas with spread or existing topsoil shall be cultivated in compliance with sub-clause 3006.29 prior to planting.

Slow release fertiliser shall be scattered over the soil in compliance with sub-clause 3006.15.

- 3006.30 A 600mm wide strip along all hedgelines except those that have been backfilled shall be cultivated in accordance with sub-clause 3006.30.

- 3006.33 The soil shall be watered to field capacity immediately after planting if there is a risk to plants of water stress or wilting.

APPENDIX 30/6: PLANTING (Continued)

**Sub-
Clause****Planting of Trees**

- 3006.38 Root barriers shall be required where the clearances required for underground services and drainage infrastructure or the integrity of structures would otherwise be adversely affected by plant roots or where required by the Relevant Authorities.
- The Contractor shall seek agreement of the relevant statutory undertaker regarding the location of proposed trees and the specification for an appropriate root barrier to be fitted in accordance with the manufacturer's recommendations.
- 3006.41 The minimum length of tree stakes for heavy standard and extra heavy standard trees shall be 2.5 metres and the minimum width 75 millimetres. Tree stake sizes for other tree forms shall be in accordance with sub-Clause 3006.41.
- Additional sub-clause Where planting on a slope, stakes may be driven at an angle mid-way between the slope below the tree and the vertical tree stem.
- 3006.43 Heavy standard and extra heavy standard trees shall be double staked. Stakes shall be driven vertically into the pit to a depth of not less than 500 millimetres below the bottom of the pit. Stakes shall not pass through the rootball.
- 3006.44 Heavy standard and extra heavy standard trees with double staking shall be secured centrally between the stakes with one set of supporting bands of fire hose or equivalent webbing of minimum width 70 millimetres positioned with the upper edge of the webbing band at 700 millimetres above ground level and 50 millimetres below the tops of the stakes which shall be driven or trimmed to 750 millimetres above ground level. Each band shall be looped around the tree stem and nailed to the stake using at least two 25 millimetre galvanised clout nails and shall be equally tensioned so as to hold the tree centrally between the stakes.
- 3006.45 Semi-mature trees shall be planted as shown on Drawing Number K5 to Volume 3 of the MCHW in compliance with the Contractor's Quality Plan and associated method statements and consented to by the Engineer.
- 3006.49 All extra heavy standard, heavy standard and standard trees shall be watered to field capacity immediately following planting. All other tree and shrub plants shall be watered to field capacity immediately after planting if there is a risk to plants of water stress or wilting.

APPENDIX 30/6: PLANTING (Continued)

**Sub-
Clause****Tubes, Guards and Ties**

3006.52 Individual plant protectors minimum 750 mm in height and 80-120mm diameter shall be used to protect all two year old transplants, cell grown plants, shrubs and conifers as a minimum.

The shelters shall be circular or octagonal in section. They shall be constructed of a rigid, translucent, recyclable, degradable plastic mesh with clear polythene film lining tube. Base ventilation shall be provided in plant protectors for Fagus species.

Shelters shall be supported by timber stakes attached by at least two releasable ratchet ties. Stakes to be circular section, "Pencilled," and a minimum of 35mm diameter in cross section. The stake shall be driven 300mm into the ground and shall not protrude above the rim height of the shelter, but shall extend at least 75mm above the top tie. One tie shall be positioned at or within, 75mm of ground level and the other within 100mm of the shelter top.

The shelter shall be carefully placed over the plant and the entire base pushed a minimum of 25mm into the ground. The stake shall be positioned at the place recommended by the manufacturer of the shelter and shall penetrate into the ground until firm.

Previously used tree and shrub shelters in sound condition may be deemed accepted by the Engineer for re-use.

All feathered trees shall be protected with spiral guards, 750mm height. Plastic spiral guards shall be made from perforated PVC strips coiled spirally into a 50mm tube. The spiral guards shall be transparent and colourless and 750mm in height. The spiral guards shall be wound round the stem of the plant to be protected to the full height of the spiral guard. The Contractor shall ensure that the gaps are kept to a minimum when winding the spiral guards around branched stems.

APPENDIX 30/6: PLANTING (Continued)

**Sub-
Clause****Planting of Reeds, Rushes, Marginal, Emergent and Aquatic Plants**

3006.73 Reeds, rushes, marginal and aquatic plants shall be planted within the wildlife pond within the junction loop at Bankfoot North Junction (approximate chainage 5900m) and SuDS detention pond drainage features. Marginal species shall be planted within the base of SuDS detention basins.

The wildlife pond at Bankfoot North Junction shall include the following species planted in single species groups of 5 to 25 plants at an average density of seven plants per square metre:

- (i) Marginal planting at the pond edge and in the 'wetland' marginal zone around the pond perimeter comprising a range of native non-invasive species including the following species:

Marsh marigold (*Caltha palustris*)

Ragged Robin (*Lychnis flos-cuculi*)

Brooklime (*Veronica beccabunga*)

- (ii) Emergent and submerged aquatic planting onto the submerged terraces around the pond margins comprising a range of native non-invasive species including the following species:

Flag Iris (*Iris pseudacorus*)

Water Starwort (*Callitriche stagnalis*)

Water mint (*Mentha aquatica*)

Water Crowfoot (*Ranunculus aquatilis*)

Lesser Spearwort (*Ranunculus lingua*)

3006.77 Excavated material from sub-clause 3006.77 operations shall be spread throughout the planting area.

Marker Posts for Planted Areas

3006.80 The Contractor shall insert marker posts to mark out the boundaries of each planting area.

Additional Sub-clause Failed plants shall be clearly marked or removed at the time of the inspection.

3006.87 The Contractor shall replace all plants found to be defective or vandalised annually for the duration of the Works until the end of the Period of Establishment Maintenance.

Additional Sub-clause Satisfactory establishment as referred to in sub-clause 3006.87 and 3006.89 shall only be deemed to have occurred where there has been a minimum extension growth of 150 millimetres per year, unless otherwise agreed with the Engineer.

3006.92 Post-planting Maintenance

The Contractor shall carry out maintenance of new planting in accordance with clauses 3007 and 3009 for the duration of the Works until the end of the Period of Establishment Maintenance.

APPENDIX 30/7: GRASS, BULBS AND WILDFLOWER MAINTENANCE

**Sub-
Clause****General Grass Maintenance**

- 3007.1 All grass and wildflower areas within the boundary of the Site shall be maintained in accordance with Clause 3007.
- 3007.5 No cutting shall be carried out within 250 millimetres of unprotected trees and shrubs. Strimmers shall not be used for cutting grass within unprotected planted areas.
- 3007.6 Grass cuttings and arisings shall be cleared from all Acid Grassland / Moorland Mix and Semi-Natural Grassland Mix areas. In all other grass areas cuttings may be left in situ provided they are finely chopped and evenly distributed over the surface of the grass.

Grass Cutting: Low frequency

- 3007.17 Low frequency grass cutting shall be undertaken in accordance with sub-clause 3007.17 in the following areas:
- (i) A 1.2 metre swathe width measured from the back edge of the carriageway or hard strip. The width of cut shall be increased accordingly where the remaining grass between the 1.2 metre area and any adjacent boundary (such as a wall, fence or planting bed) is less than 2 metres;
 - (ii) Grassed areas within visibility splays; and
 - (iii) Where there are footpaths remote from the carriageway edge where grass between the road and footpath receives a low frequency cut, the outside edge of the footpath shall be subject to the same regime for a width of 1 metre.

Additional selective cuts shall be undertaken as necessary to maintain visibility. The areas subject to additional selective cuts shall be extended beyond the minimum area required to maintain visibility in order that they appear naturalistic with smoothly curving edges, avoiding straight lines and abrupt angles.

Grass Cutting: Minimal Frequency

- 3007.18 All grass areas not cut at medium or low frequency shall be cut at a 'minimal frequency' in accordance with sub-Clauses 3007.18-21, except those seeded with a grass/wildflower mixture.
- 3007.20 Additional selective cuts shall be undertaken if required to maintain visibility of road signs. The areas subject to additional selective cuts shall be extended beyond the minimum area required to maintain visibility in order that they appear naturalistic with smoothly curving edges, avoiding straight lines and abrupt angles.

Grass Cutting: Banks and Ditches

- 3007.22 All banks and ditches shall be cut in accordance with sub-clause 3007.22. All arisings shall be dispersed over the sward avoiding the blocking of drains and ditches.

APPENDIX 30/7: GRASS, BULBS AND WILDFLOWER MAINTENANCE (Continued)
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**Sub-
Clause****Grass Cutting: Areas of Planting**

- 3007.23 All grass cutting in planting areas shall be cut in accordance with sub-clause 3007.23. The cutting shall include bramble but exclude naturally regenerated tree and shrub seedlings, the retention of which would be consistent with the overall management objectives for the planting area and in compliance with the Contractor's Quality Plan and associated method statements.
- 3007.24 All large arisings such as brambles resulting from cutting operations within planting areas shall be removed off Site.

Wildflower Areas and Areas of Nature Conservation Value

- 3007.26 - 27 All Semi-Natural Grass and Acid Grassland / Moorland Mix grassland areas shall be inspected by the Contractor's Ecological Clerk of Works (EcoW) throughout the Period of Establishment Maintenance to assess the progress of establishment.
- All areas seeded with wildflowers shall be cut according to the most appropriate regime detailed in sub-clause 3007.26 and according to sub-clause 3007.27. The cutting regime shall be in compliance with the recommendations of their Contractor's ECoW, the Contractor's Quality Plan and associated Method Statements to suit the wildflowers within the seed mixes as specified in sub-clause 3005.4.
- 3007.28 The ground shall be scarified only where it is necessary for wildflower colonisation in compliance with the Contractor's Quality Plan and associated Method Statements and agreed in writing by the Engineer.
- 3007.29 Spot herbicide treatment in accordance with sub-clause 3007.29 shall be carried out at an appropriate frequency in all wildflower areas to eliminate undesirable broadleaf weed species.
- Areas of self-seeding broadleaf plants considered to be desirable for nature conservation shall be retained. These areas shall be identified by the Contractor to the Engineer.
- 3007.30 Areas of wildflower seeding that cannot be effectively controlled by chemical means without risk to or damage to wildflowers shall be hand weeded to eliminate undesirable broadleaf weed species.
- Additional Sub-clause All damaged or failed sward shall be reinstated with seed to match the surrounding area.

Molehills

- 3007.31 Molehills shall be removed before grass cutting as specified in sub-clause 3007.4.

APPENDIX 30/8: WATERING

**Sub-
Clause****Establishment Watering**

3008.6 The Contractor shall water all planting for the Period of Establishment Maintenance at a frequency necessary to ensure establishment and survival.

Additional Watering

3008.7 Additional watering shall be undertaken to all areas as instructed by the Engineer in accordance with sub-clause 3008.7 in periods of abnormally dry conditions.

APPENDIX 30/9: ESTABLISHMENT MAINTENANCE FOR PLANTING

**Sub-
Clause****General**

3009.1 All planting and planting areas shall be maintained for the Period of Establishment Maintenance in accordance with sub-clauses 3009.2 to 3009.25.

Stakes, Tubes, Guards and Their Ties

Additional Sub-clause Shelters, spirals, guards and stakes shall be maintained upright and in firm contact with the ground. Horizontal crossbars/ties shall be maintained in good working order.

3009.4 Tree stakes, tubes, guards and ties shall be removed from plants when they are no longer required, and in any event before the end of the Period of Establishment Maintenance, and shall be offered to the Engineer for re-use. Where the Engineer declines the offer the Contractor shall dispose of them off Site.

Pruning

Additional Sub-clause Branches and stems shall be cut back so that they do not encroach into visibility splays or footpaths, cycleways or roads.

Weed Control: Young Trees and Shrubs in Grass Plots

3009.9 Delete sub-Clause 9 and insert:

Plant circles shall be defined as the area within which weed control operations shall be carried out as follows:

- (i) In woodland and scrub planting areas the area within 250 millimetres radius of an individual tree or shrub.

For standard, heavy standard or extra heavy standard trees in grassed or wildflower areas the area within 500 millimetres radius of an individual tree.

3009.10 Translocated herbicide shall be applied at a frequency as necessary to keep plant circles in all woodland and scrub planting areas weed free, whilst protecting trees and shrubs from the herbicide. Hand weeding shall be undertaken to remove weeds from within tree and shrub shelters and guards.

3009.11 Where alternative means of weed control prove ineffective residual herbicide shall be applied at a frequency as necessary to keep plant circles weed free in accordance with sub-clause 3009.11.

APPENDIX 30/9: ESTABLISHMENT MAINTENANCE FOR PLANTING (Continued)

**Sub-
Clause****Weed Control: Hedges**

3009.20 All hedges and an area of 300mm width on either side of the hedge plants bases shall be maintained weed free for the duration of the Period of Establishment Maintenance in accordance with sub-clause 3009.20.

Additional Sub-clause During the first 2 years after planting, hedge plants shall be pruned once each year between 1st September and 31st January to encourage formation of a vigorous, compact, uniform hedge. The current year's growth of prominent new shoots shall be reduced in length by one third. Arisings shall be distributed on Site.

Inspection of Extra Heavy Standard and Heavy Standard Trees and Rootballed Conifers

Additional Sub-clause All extra heavy standard and heavy standard trees and rootballed conifer trees shall be inspected and maintained annually in accordance with sub clause 3009.25.

APPENDIX 30/10: MAINTENANCE OF ESTABLISHED TREES AND SHRUBS

**Sub-
Clause**

3010.1 All established trees and shrubs shall be maintained for the duration of the period of the Works and the Period of Establishment Maintenance in accordance with sub-clauses 3010.2 - 3010.71.

Arisings from Pruning, Cutting or Felling of Woody Plants

3010.4 Healthy arisings shall be dealt with in accordance with one or more of items (iv) to (ix) of sub-Clause 3010.4 in compliance with the Contractor's Quality Plan and associated method statements.

Hedge Maintenance

3010.12 Hedges shall be cut once a year between September and January.

3010.20 If any hedge laying shall be required it shall be undertaken in an appropriate style in order to reflect the adjacent or local appearance.

3010.22 Mixed hedgerows shall be laid in an appropriate style in order to reflect the adjacent or local appearance.

3010.31 New hedge plants to infill significant gaps in hedges after they have been laid or cut shall be of size, species, and planting density to match the existing hedgerow.

Tree Surgery

3010.45 Tree size categories shall be in compliance with the Contractor's Quality Plan and associated method statements.

3010.54 Crown lifting shall be in compliance with the Contractor's Quality Plan and associated method statements.

3010.55 Crown thinning shall be in compliance with the Contractor's Quality Plan and associated method statements.

3010.56 Crown reduction or reshaping shall be in compliance with the Contractor's Quality Plan and associated method statements.

APPENDIX 30/10: MAINTENANCE OF ESTABLISHED TREES AND SHRUBS (Continued)

**Sub-
Clause****Tree Felling**

- 3010.57 Straight felling shall be in compliance with the Contractor's Quality Plan and associated method statements.
- 3010.58 Sectional felling shall be in compliance with the Contractor's Quality Plan and associated method statements.
- 3010.59 Stumps shall be cut as close to the ground as possible or where the tree is growing in a hedge the stump shall be left level with the top of the hedge.
- 3010.60 Stump treatment shall be in compliance with the Contractor's Quality Plan and associated method statements.
- 3010.62 Stump removal shall be in compliance with the Contractor's Quality Plan and associated method statements.
- 3010.63 All arisings shall be disposed of off the Site or placed within woodland areas as log piles and or windrows where this is consistent with the management objectives for the woodland and the Contractor's Quality Plan and associated method statements.

Thinning and Coppicing

- 3010.65 Thinning and coppicing shall be carried out in areas of establishing and maturing woodland in accordance with Table 30/10.1 and where identified as being required by the Contractor's regular inspections.

Scrub Control in Grass

- 3010.68 Undesirable scrub species shall be controlled in accordance with Table 30/10.1 and where identified as being required by the Contractor's regular inspections.
- 3010.69 Undesirable scrub tree and shrub species that shall be controlled shall typically have a stem diameter of 0-75 millimetres and a height of 0.75-2.5 metres.
- Additional Clause Undesirable scrub species shall be cut down to 50mm above ground level and plants allowed to re-grow. The Contractor shall then apply translocated herbicide during the first year of active growth after cutting at a suitable to time to maximize the effectiveness of the herbicide.
- 3010.71 Operations in accordance with sub-clause 3010.71 shall be carried out in compliance with Table 30/10.1 and the Contractor's Quality Plan and associated method statements.

APPENDIX 30/11: MANAGEMENT OF WATERBODIES

**Sub-
Clause**

3011.1 The management operations under Clause 3011 shall take place in all waterbodies and open ditches within the Site. The Contractor shall compile a schedule of areas and operations in accordance with Clause 3011 for the management of ponds and ditches that are part of the road drainage system.

3011.3 All inlets and outlets that form part of the Works shall be inspected in accordance with sub-clause 3011.3.

Weed Control

3011.4 The Contractor shall eliminate injurious weeds growing within or immediately adjacent to water bodies. Ponds, swales and ditches shall be inspected annually for build - up of invasive weeds. All waterbodies on the site shall be monitored for the following species and, where necessary, control measures shall be implemented:

- Monkey flower (*Mimulus guttatus*)
- New Zealand pygmy weed (*Crassula helmsii*)
- Canadian pondweed (*Elodea canadensis*)
- Water fern (*Azolla filiculoides*) – to be treated by nematode
- Parrot's feather (*Myriophyllum aquaticum*)
- Floating marsh pennywort (*Hydrocotyle ranunculoides*)
- Nuttall's pondweed (*Elodea nuttallii*)
- Curly pondweed (*Lagarosiphon major*)
- Least duckweed (*Lemna minuta*)
- Water hyacinth (*Eichhornia crassipes*)
- Water chestnut (*Trapa natans*)
- Water lettuce (*Pistia stratiotes*)

Where reed growth covers more than 80% of the surface area of any ponds, it should be reduced to no more than 50% of the surface area.

3011.6 Injurious weeds in or on the banks of waterbodies within the Site shall be removed by hand in accordance with sub-clause 3002.8. Before resorting to chemical control of overgrown ponds and ditches, vegetation should be removed by physical means, either through the use of rakes or nets. Removed vegetation shall be left around the edges of the pond for at least two days to allow any wildlife to return to the pond. The removed vegetation shall then be removed from site.

APPENDIX 30/11: MANAGEMENT OF WATERBODIES (Continued)

**Sub-
Clause****Silt**

- 3011.8 Silt shall be removed from waterbodies that are part of the road drainage system as required to maintain their functional requirements in accordance with sub-clause 3011.8. The Contractor shall be responsible for consulting with SEPA and any other relevant bodies prior to undertaking any operations affecting a water body.

Reedbeds and Marginal Plants

- 3011.10 All reedbeds and marginal and emergent plants shall be inspected twice a year in early February and October in accordance with sub-clause 3011.9.

Additional Sub-clause All marginal, emergent and aquatic plants shall be maintained by the Contractor for the duration of the Works until the end of the Period of Establishment Maintenance with any failed or defective plants replaced annually in accordance with Clause 3006.

APPENDIX 30/12: SPECIAL ECOLOGICAL MEASURES

**Sub-
Clause**

3012.1 Special ecological measures shall be maintained for the duration of the Works until the end of the Period of Establishment Maintenance.

The Contractor shall rigorously follow and adhere to the mitigation measures set out in the documents listed in Appendix Q of Part 3 of the Employer's Requirements in respect to terrestrial and aquatic habitats and European Protected Species.

The Contractor shall protect the local soils and not relocate the seed-bearing topsoil anywhere on Site other than the same area it was stripped from.

Where loss of woodland (excluding riparian) is necessary for the construction of the scheme this shall be reinstated following the Works using retained original soils and replanted with native species.

The Contractor shall comply with SEPA Pollution Prevention Guidelines (PPG) and Guidance for Pollution Prevention (GPP) and use of SuDS to protect the River Tay and other watercourses.

The Contractor shall be responsible for obtaining the relevant European Protected Species licences from SNH in respect to any works likely to result in the disturbance, damage or destruction to a resting place used by a European Protected Species (otter and bats) prior to the commencement of works.

An invasive non-native species management plan shall be produced and put into operation prior to construction to avoid the risk of illegally spreading invasive non-native species.

Site staff must be made aware of the potential presence of European Protected Species within the Works area and details must be included in the site induction.

Toolbox talks shall be given to all site operatives at the start of the project before any work commences. The talks shall confirm the species that may be affected by or encountered during the Works as identified in the Contractors preconstruction surveys. The toolbox talks will also promote general environmental awareness of the site and detail contractor's commitment to the ecological interests of the local vicinity, including adherence to the mitigation measures set out in the Environmental Statement.

APPENDIX 30/12: SPECIAL ECOLOGICAL MEASURES (Continued)

**Sub-
Clause****Tunnels, Fencing and Underpasses for Wildlife**

3012.3 Dry mammal underpasses, culverts and culvert ledges, overbridges, underbridges, fencing and underpasses and any other mitigation measures for wildlife shall be designed, located and installed in accordance with SNH guidance, DMRB and any other relevant consultees and shall take account of current best practice and statutory guidance. If there is any discrepancy between SNH guidance and Clause 3012, SNH guidance shall prevail.

The location and extent of fencing for protected fauna shall be consistent with the requirements of the Environmental Assessment Documents, as listed in Appendix Q of Part 3 of the Employer's Requirements.

All badger and otter fencing shall be completed to the approval of the Contractor's ecological specialist who shall oversee installation. Fencing shall be completed in advance of opening the road to vehicular traffic.

Where there is the requirement for badger or otter fencing along the same line as other fence types (e.g. a permanent boundary of stock proof fencing or deer fencing) a single fence which combines the specifications and functions of both types shall be used.

3012.5 In February and October of each year the Contractor shall inspect all wildlife fences, badger gates, badger and otter access gates, dry mammal underpasses, culverts and culvert ledges, overbridges, underbridges, underpasses and the green bridge at Gelly and report their condition to the Engineer.

Additional Sub-clause Cameras shall be set up facing the tunnel entrances in consultation with the ECoW. The cameras shall be set up at the location best suited to capturing movement of mammals through these underpasses. The Contractor shall monitor these cameras monthly to ensure continuous operation though out the Period of Establishment Maintenance and shall submit to the Engineer all data recorded.

APPENDIX 30/12: SPECIAL ECOLOGICAL MEASURES (Continued)

**Sub-
Clause****Artificial Nests, Boxes, Perches and other Wildlife Shelters**

- 3012.8 As a minimum bat boxes shall be provided at the locations indicated on the Indicative Landscape and Planting Works Drawings, as listed in Appendix 0/4 of the Specification.
- 3012.9 Bat boxes shall be inspected annually by a licensed bat ecologist and their condition reported to the Engineer.
- 3012.10 Bat boxes shall be repaired or if not possible replaced with a like for like model within one month.

Other Habitat Creation Measures

- 3012.11 Other habitat creation measures including, but not limited to, amphibian ponds, green bridges and principal structures shall be inspected annually and their condition reported to the Engineer.
- 3012.12 The movement of artificial, moveable hedges required for bat mitigation in relation to temporary works shall be approved by the Contractor's ecological specialist who shall oversee their installation.

Water levels within culverts shall be sufficient enough to enable fish passage at all times of the year and be free of any obstruction. Fish species shall be protected and moved from the area affected by the works and placed into the watercourse further downstream.

APPENDIX 30/12: SPECIAL ECOLOGICAL MEASURES (Continued)

**Sub-
Clause**

3012.13 The Contractor shall obtain licences or use only licensed operatives for all works in the vicinity of protected species. Notwithstanding any other provision of the Contract working buffer zones shall comply with SNH requirements as per Table 30/12.1.

Table 30/12.1 Protected Species Protection Zones for Works which may cause Disturbance

Species	Normal Protection Zone	Protection zone during breeding season (at a proven breeding location)	Protection zone for specific activities	Breeding Seasons
Red squirrel	1 tree from the drey tree (or 5 metres radius whichever is lesser)	50m	100m from high noise / vibration activities such as pile driving or blasting.	Breeding Season 1st February until 30th September
Pine marten	30m	100m	100m from high noise / vibration activities such as pile driving or blasting.	Breeding Season 1st March until 31st August
Badger	30m	30m	100m from high noise / vibration activities such as pile driving or blasting.	Breeding Season 1st December until 1st July.
Otter	30m	200m	100m from high noise / vibration activities such as pile driving or blasting.	Breeding all year round
Birds	For information about disturbance distances for birds see 'A review of disturbance distances in selected bird species - Ruddock and D P Whitfield http://www.snh.gov.uk/planning-and-development/advice-for-planners-and-developers/birds/			

APPENDIX 30/12: SPECIAL ECOLOGICAL MEASURES (Continued)

Birds

To mitigate against the potential damage to or destruction of active nests and the removal of vegetation providing shelter, protection and foraging habitat for breeding birds and their young, vegetation and tree removal shall be minimised and avoided where possible. Habitat clearance work shall be undertaken between September and February inclusive to avoid the main breeding season of March to August inclusive.

If clearance work is to be undertaken during the breeding season, an ornithologist (who shall be knowledgeable of bird nesting behaviour and experienced at nest finding) shall check for active nests and advise accordingly. Active nests shall be left undisturbed until the nesting attempt is complete.

If breeding osprey is confirmed, an exclusion zone shall be developed in consultation with SNH. Works required within the exclusion zone shall not be undertaken during the breeding season (March to July inclusive).

Bats

As many mature trees as possible shall be retained to provide potential bat roost and foraging habitat. Any mature trees to be felled shall be checked before scheduled felling/site clearance by the ECoW or a licensed bat ecologist. If suitable cavities to host bats are found to be unoccupied these shall be blocked to prevent subsequent use by bats prior to felling.

Trees confirmed as bat roosts shall only be felled under a European Protected Species licence from SNH, and at a time when it has been confirmed that no bats are present within the roost. Soft-felling techniques shall be used and tree-specific mitigation shall be determined on a tree by tree basis and undertaken under the terms of the licence.

Appropriate mitigation and compensation for loss of bat roosts shall be required as stipulated under the terms of a European Protected Species licence. Irrespective of any licensed bat mitigation, for each bat roost removed as part of the works, a minimum of three 'woodcrete' bat boxes shall be installed on trees within nearby retained woodland habitat, to act as artificial roost sites. The precise number, specification and location of these bat boxes shall be agreed with the ECoW or licenced bat ecologist.

Night time working shall be avoided where possible. Where artificial lighting is essential, light spill shall not be permitted over watercourses and riparian habitat, in order to avoid disturbance to bats. Cowlings shall be used to prevent light spill over areas of bat habitat.

APPENDIX 30/12: SPECIAL ECOLOGICAL MEASURES (Continued)

Badgers

A pre-construction survey for badger activity within at least 50m of the scheme footprint shall be undertaken and this shall be updated throughout the construction Works.

The Contractor shall be responsible for obtaining a badger development licence from SNH for any work considered, through consultation with SNH, to result in disturbance, damage or destruction of a badger sett. Licence applications shall be made for hand digging within 10m, heavy machinery operating within 30m, and piling or use of explosives within 100m. No works shall be permitted until the required licences have been obtained by the Contractor. It should be noted that badger development licences in respect to the exclusion of badger setts are not generally issued between December to June inclusive. The conditions of any licences shall be fully adhered to.

Red squirrel

A pre-construction survey for red squirrel dreys shall be undertaken and this shall be updated throughout the construction Works. The Contractor shall avoid impact on red squirrels and their dreys or, if this is not possible, a licence from SNH shall be required in order to work near to or remove a drey.

Otters

A pre-construction survey for otter activity within 250m of the scheme footprint shall be undertaken and this shall be updated during the construction Works.

The Contractor shall be responsible for obtaining the relevant European Protected Species licence from SNH for any Works that result in disturbance, damage or destruction of otter resting sites. Disturbance to otter resting sites that occur within 30m of the development footprint must be licensed by SNH prior to any works starting; if a breeding holt is suspected this distance increases to 250m.

Night time working shall be avoided where possible. Where artificial lighting is essential, light spill shall not be permitted over watercourses and riparian habitat in order to avoid disturbance to otter. Cowlings shall be used to prevent light spill over areas of otter habitat.

APPENDIX 30/12: SPECIAL ECOLOGICAL MEASURES (Continued)

Fish

Subject to the conditions of the CAR licence(s), in-channel works and piling shall be programmed to avoid the salmonid and lamprey spawning and salmonid egg incubation periods (mid-October to June inclusive). Soft-start techniques shall be applied to piling work procedures to encourage sensitive species to evacuate the area.

In channels to be de-watered, fish shall be removed and relocated to a pre-identified location under the supervision of the ECoW.

Amphibians

The Contractor shall avoid impact on amphibians. Destructive searches of terrestrial habitats shall be undertaken prior to site clearance making the habitat unsuitable for amphibians. Searches shall be carried out between March to October. Amphibians captured shall be relocated under the supervision of the ECoW to pre-identified areas.

Greater Butterfly Orchids

The Contractor shall avoid impact on Greater Butterfly Orchids (*Platanthera chlorantha*). Where orchids are likely to be affected, these shall be translocated as full cohesive turves to a suitable receptor site as determined by the ECoW. Transplanted orchids shall be subject to appropriate after care.